NATIONAL

Service Manual

ORDER NO. SDT-160

FET/SOLID STATE
AM/FM MULTIPLEX STEREO RADIO-PHONO
WITH SEPARATE SPEAKER SYSTEM

MODEL SG-970A

SPECIFICATIONS

Frequency Range:	FM 87.5 ~ 108 MHz	(3.43 ~ 2.78 m)	
	AM 525 ~ 1605 kHz	(571 ~ 187 m)	
Intermediate Frequency:	FM 10.7 MHz		
	AM 455 kHz		
Transistors:	2SK19	FM RF Amplifier (FET)	
	2SC920	FM Mixer	
	2SC829	FM Oscillator	
	2SC829	FM 1st IF Amplifier	
	2SC829	AM Converter	
	2SC829	FM 2nd IF Amp. & AM 1st IF Amp.	
	2SC829	FM 3rd IF Amp. & AM 2nd IF Amp.	
	2SC829	Distributor	
	2SC829	19 kHz Amplifier	
	2SA101	38 kHz Amplifier	
	2SC829	DC Amplifier	
	2SB178	DC Switching	
	2SA564	1st AF Amplifier (left)	
	2SA564	1st AF Amplifier (right)	
	2SB173	2nd AF Amplifier (left)	
	2SB173	2nd AF Amplifier (right)	
	2SB173	3rd AF Amplifier (left)	
	2SB173	3rd AF Amplifier (right)	
	2SB176	4th AF Amplifier (left)	
	2SB176	4th AF Amplifier (right)	
	2SB473	Power Output (left)	
	2SB473	Power Output (left)	
	2SB473	Power Output (right)	
	2SB473	Power Output (right)	
Diodes:	SC-15	AFC	
	0A90	FM AGC	
	0A90	FM AGC	
	0A90	FM AGC	
	0A90	FM Discriminator	Pair
	0A90	FM Discriminator	
	0A90	AM Detector	
	0A90	Doubler	Pair
	0A90	Doubler	
	0A90	L–R Detector	Two Pairs
	0A90	L–R Detector	
	0A90	L–R Detector	
	0A90	L–R Detector	
	EYV-320D1R2J2	AOC	
Thermistors:	ERT-D2FGK750S	Temperature Compensator (four)	
Sensitivity:	FM 3μV/50 mW for 30 db Quieting AM 100μV/m/50mW		
Power Output:	5W–5W MPO (IHF)		
Power Source:	AC 110V, 125V, 210V, 240V 50 ~ 60 Hz		
Speakers:	Two 16 cm PM Dynamic (16Ω)		
Recorded Changer:	FA-707A		
Cartridge:	EPC-34TTCD Magnistate, with Stylus		
Stylus:	EPS-13TTSD Flipover Diamond		
Phonomotor:	AC Motor (120V 50 Hz) 4 Speed		
Cabinet Dimensions:	Tuner Cabinet 430 (W) x 175 (H) x 409 (D) mm (16-5/16") (6-7/8") (16-1/16") Speaker System 232 (W) x 345 (H) x 190 (D) mm (9-1/8") (13-9/16") (7-1/2")		
Weight:	Tuner Cabinet 10 kg. (22 lb.) Speaker System 2 kg. (4 lb. 6½ oz) each		

〈EXPORT DIVISION〉
MATSUSHITA ELECTRIC TRADING CO., LTD.
P.O. Box 288, Central Osaka, Japan

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
RADIO and STEREO DIVISION

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PARTS IDENTIFICATION

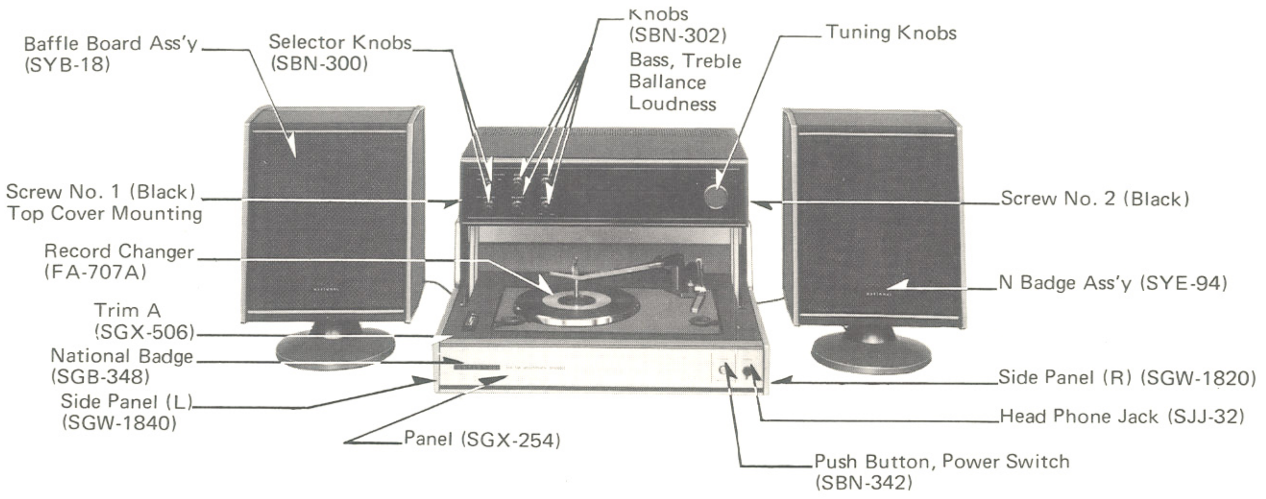

Baffle Board Ass'y (SYB-18)
Selector Knobs (SBN-300)
Knobs (SBN-302) Bass, Treble Ballance Loudness
Tuning Knobs
Screw No. 1 (Black) Top Cover Mounting
Screw No. 2 (Black)
Record Changer (FA-707A)
N Badge Ass'y (SYE-94)
Trim A (SGX-506)
National Badge (SGB-348)
Side Panel (L) (SGW-1840)
Side Panel (R) (SGW-1820)
Head Phone Jack (SJJ-32)
Panel (SGX-254)
Push Button, Power Switch (SBN-342)

Fig. 1 FRONT VIEW

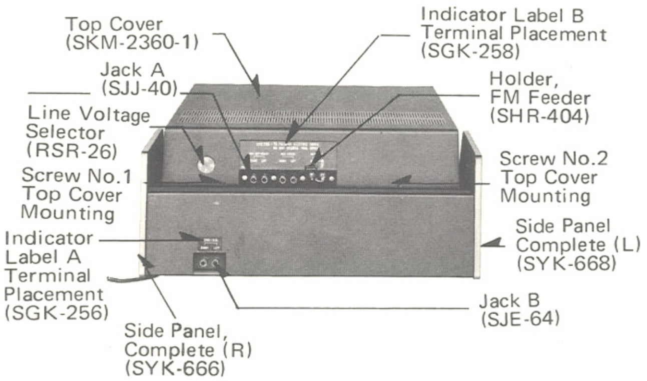

Top Cover (SKM-2360-1)
Indicator Label B Terminal Placement (SGK-258)
Jack A (SJJ-40)
Holder, FM Feeder (SHR-404)
Line Voltage Selector (RSR-26)
Screw No.2 Top Cover Mounting
Screw No.1 Top Cover Mounting
Side Panel Complete (L) (SYK-668)
Indicator Label A Terminal Placement (SGK-256)
Jack B (SJE-64)
Side Panel, Complete (R) (SYK-666)

Fig. 2 REAR VIEW

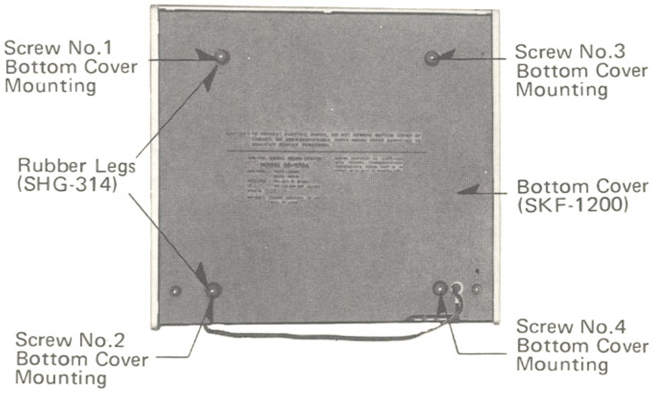

Screw No.1 Bottom Cover Mounting
Screw No.3 Bottom Cover Mounting
Rubber Legs (SHG-314)
Bottom Cover (SKF-1200)
Screw No.2 Bottom Cover Mounting
Screw No.4 Bottom Cover Mounting

Fig. 3 BOTTOM VIEW

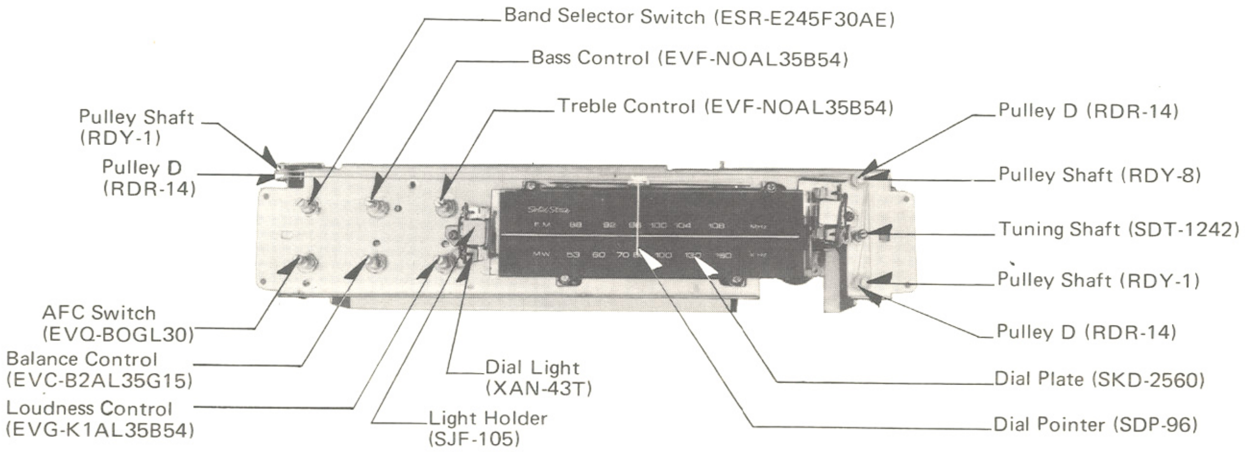

Band Selector Switch (ESR-E245F30AE)
Bass Control (EVF-NOAL35B54)
Treble Control (EVF-NOAL35B54)
Pulley Shaft (RDY-1)
Pulley D (RDR-14)
Pulley D (RDR-14)
Pulley Shaft (RDY-8)
Tuning Shaft (SDT-1242)
Pulley Shaft (RDY-1)
Pulley D (RDR-14)
AFC Switch (EVQ-BOGL30)
Balance Control (EVC-B2AL35G15)
Dial Light (XAN-43T)
Dial Plate (SKD-2560)
Loudness Control (EVG-K1AL35B54)
Light Holder (SJF-105)
Dial Pointer (SDP-96)
FM 88 92 96 100 104 108 MHz
MW 53 60 70 80 100 130 160 kHz

Fig. 4 CHASSIS

DISASSEMBLY INSTRUCTIONS

To Remove Speaker
(Refer to Figs. 5 & 6)

1. Remove four (4) rear cover mounting screws, Nos. 1-4, as shown in Fig. 5.
2. Unsolder wires from speaker terminal.
3. Remove four (4) speaker mounting nuts, Nos. 7-10, as shown in Fig. 6.
4. To reassemble, reverse above procedure.

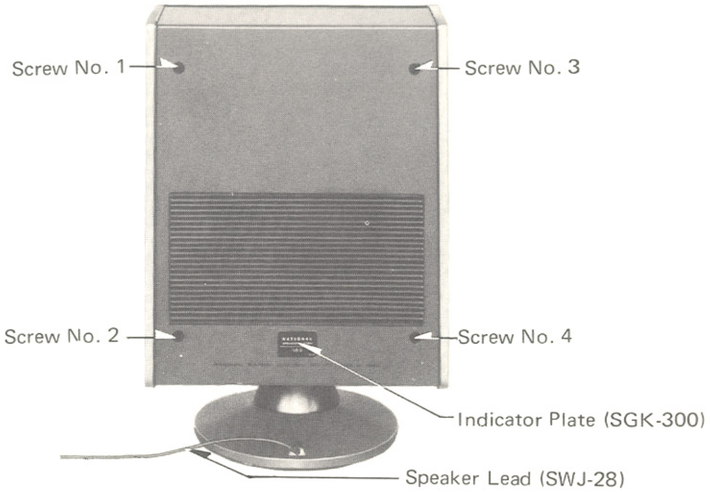

Screw No. 1
Screw No. 3
Screw No. 2
Screw No. 4
Indicator Plate (SGK-300)
Speaker Lead (SWJ-28)

Fig. 5

To Remove Baffle Board
(Refer to Figs. 5 & 6)

1. Remove four (4) rear cover mounting screws, Nos. 1-4, as shown in Fig. 5.
2. Remove four (4) speaker mounting nuts, Nos. 7-10, as shown in Fig. 6.
3. Remove six (6) baffle board mounting nuts, Nos. 1-6, as shown in Fig. 6.
4. To reassemble, reverse above procedure.

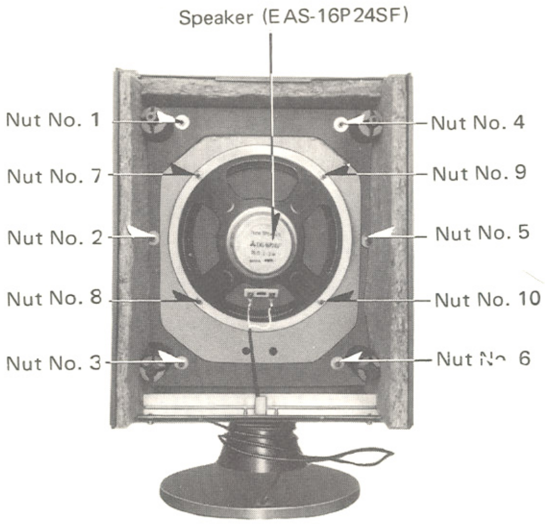

Speaker (EAS-16P24SF)
Nut No. 1
Nut No. 4
Nut No. 7
Nut No. 9
Nut No. 2
Nut No. 5
Nut No. 8
Nut No. 10
Nut No. 3
Nut No. 6

Fig. 6

To Remove Record Changer
(Refer to Figs. 3 & 7)

1. Remove four (4) bottom cover mounting screws, Nos. 1-4, as shown in Fig. 3 on page 1.
2. Unplug receptacle housing from plug housing, as shown in Fig. 7.
3. Unplug two pin plugs from changer jacks, as shown in Fig. 7.
4. Remove four (4) changer mounting circlips and washers, as shown in Fig. 7.
5. To reassemble, reverse above procedure.

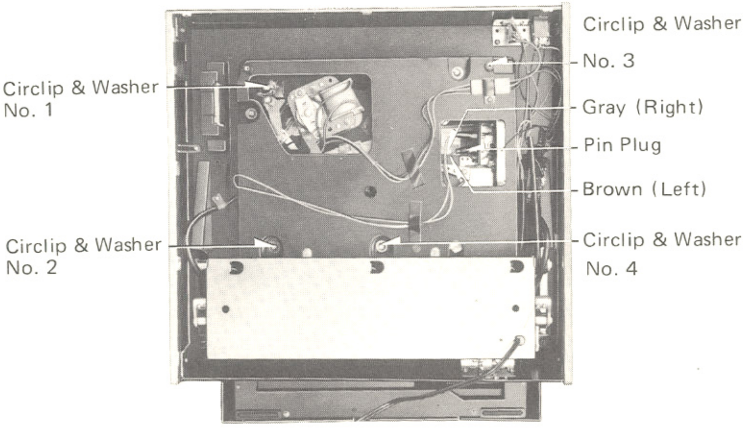

Circlip & Washer No. 1
Circlip & Washer No. 3
Gray (Right)
Pin Plug
Brown (Left)
Circlip & Washer No. 2
Circlip & Washer No. 4

Fig. 7 BOTTOM VIEW (BOTTOM COVER OPEN)

DISASSEMBLY INSTRUCTIONS

To Remove Chassis (Refer to Figs. 1, 2, 8 & 9)

1. Remove two (2) top cover mounting screws (left & right), Nos. 1-2, as shown in Fig. 1 on page 1.
2. Remove two (2) top cover mounting screws (rear side), Nos. 1-2, as shown in Fig. 2 on page 1.
3. Remove four (4) chassis mounting screws (left & right), Nos. 1-4, as shown in Figs. 8 & 9.
4. Unplug receptacle housing from plug housing and four pin plugs from pin jacks C, as shown in Figs. 8 & 9.
5. Remove lead holder from chassis as shown in Fig. 7.
6. To reassemble, reverse above procedure.

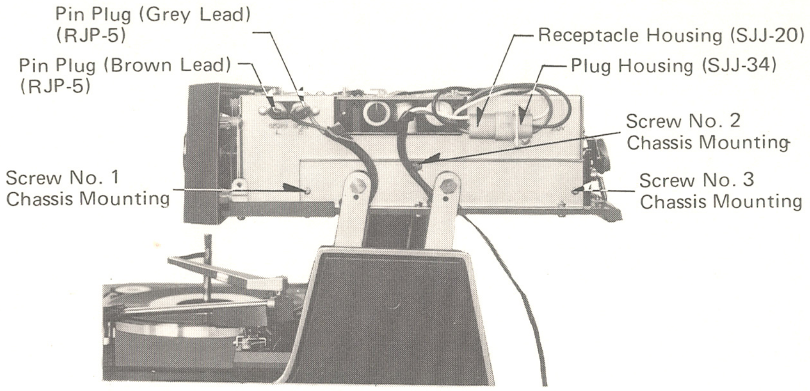

Pin Plug (Grey Lead)
(RJP-5)
Pin Plug (Brown Lead)
(RJP-5)
Receptacle Housing (SJJ-20)
Plug Housing (SJJ-34)
Screw No. 2
Chassis Mounting
Screw No. 1
Chassis Mounting
Screw No. 3
Chassis Mounting

Fig. 8 RIGHT SIDE VIEW

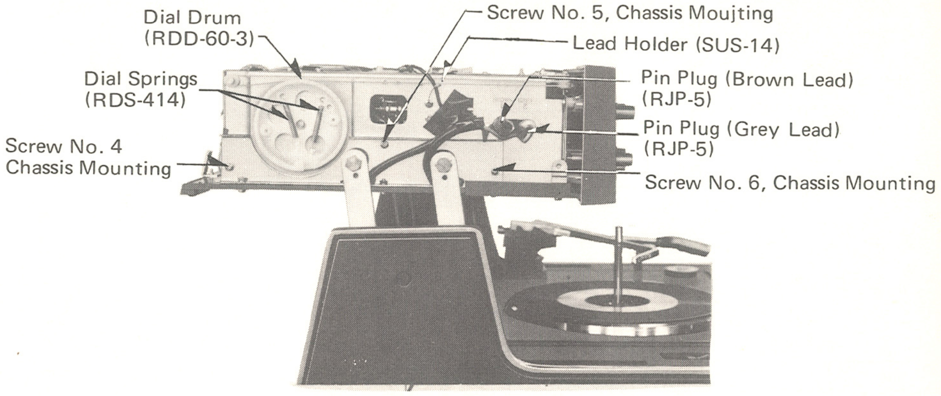

Dial Drum
(RDD-60-3)
Screw No. 5, Chassis Moujting
Lead Holder (SUS-14)
Dial Springs
(RDS-414)
Pin Plug (Brown Lead)
(RJP-5)
Pin Plug (Grey Lead)
(RJP-5)
Screw No. 4
Chassis Mounting
Screw No. 6, Chassis Mounting

Fig. 9 LEFT SIDE VIEW

To Remove Escutcheon From Chassis (Refer to Figs. 9, 10 & 11)

1. Follow instruction 1 to 5 above.
2. Remove seven (7) chassis mounting screws Nos. 1-7, as shown in Figs. 10 & 11.
3. To reassemble, reverse above procedure.

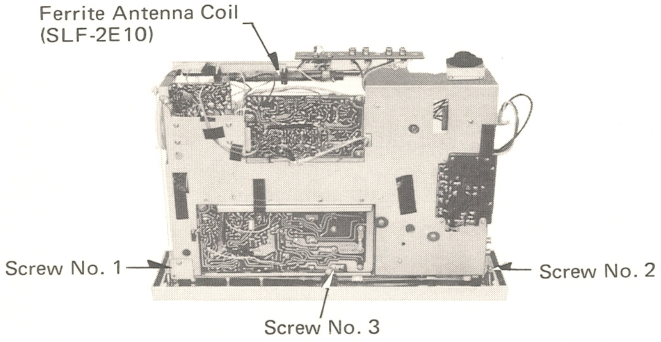

Ferrite Antenna Coil
(SLF-2E10)
Screw No. 1
Screw No. 2
Screw No. 3

Fig. 10

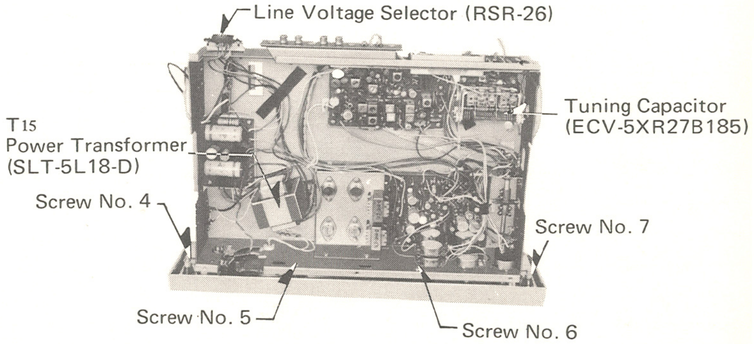

Line Voltage Selector (RSR-26)
T15
Power Transformer
(SLT-5L18-D)
Tuning Capacitor
(ECV-5XR27B185)
Screw No. 4
Screw No. 7
Screw No. 5
Screw No. 6

Fig. 11

DIAL CORD STRINGING GUIDE

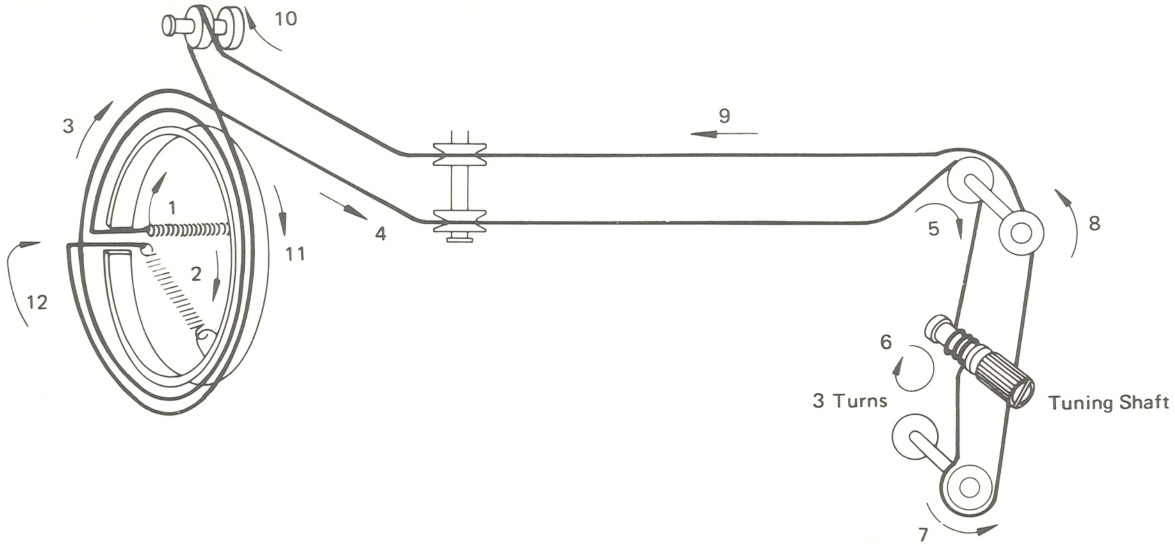

10
3
9
1
2
11
4
12
5
8
6
3 Turns
Tuning Shaft
7

Fig. 12

Notes:

1. Tuning capacitor should be positioned at minimum capacity (open).
2. Numbered arrows (1-12) indicate correct order of stringing dial cord.
3. Cement dial cord ends.

To Mount Dial Pointer

1. Set tuning capacitor to fully closed position.
2. Set dial pointer to starting point.
3. Attach dial cord to dial pointer.

PARTS IDENTIFICATION

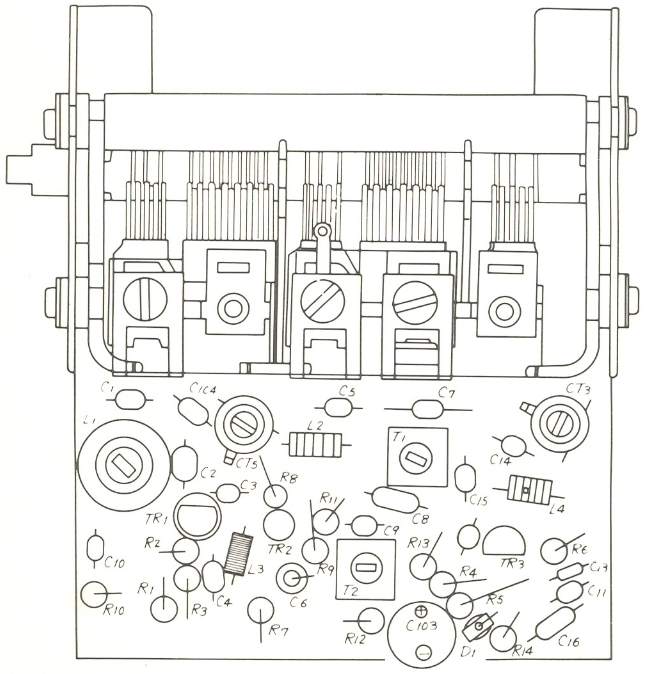

C1
C14
C5
C7
CT3
L2
T1
CT5
C2
C3
R8
R11
C9
C8
C15
L4
TR1
R2
TR2
R9
R13
R4
TR3
R6
C10
R1
L3
C4
C6
T2
R5
C11
R10
R3
R7
R12
C103
D1
R14
C16

Fig. 13 RF SECTION (FM & AM)

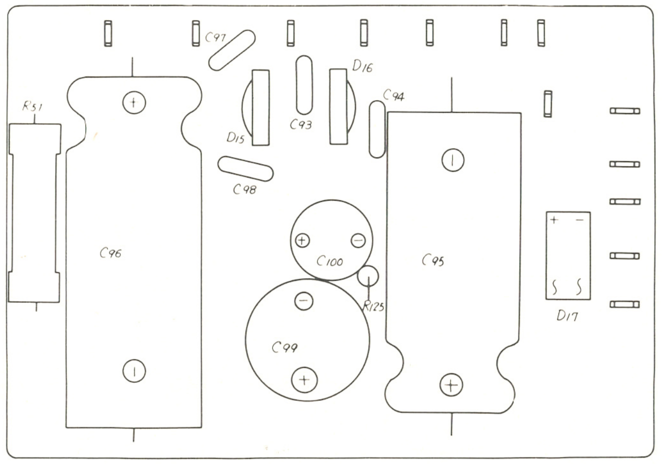
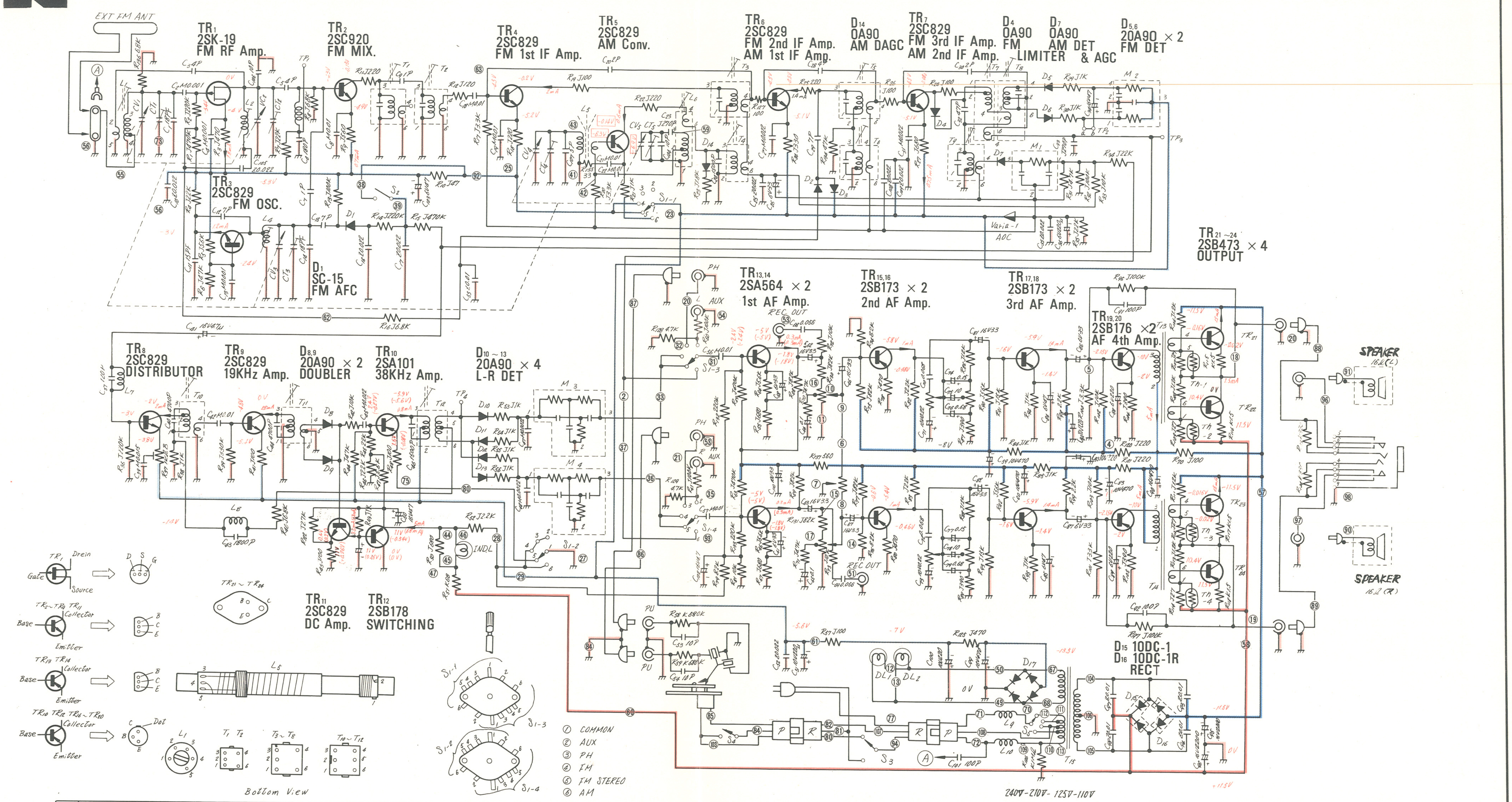

C97
D16
C94
R31
C93
D15
C98
C96
C100
C95
R125
C99
D17

Fig. 14 POWER SUPPLY SECTION

SCHEMATIC DIAGRAM MODEL SG-970A


EXT FM ANT
TR1 2SK-19 FM RF Amp.
TR2 2SC920 FM MIX.
TR4 2SC829 FM 1st IF Amp.
TR5 2SC829 AM Conv.
TR6 2SC829 FM 2nd IF Amp. AM 1st IF Amp.
D14 OA90 AM DAGC
TR7 2SC829 FM 3rd IF Amp. AM 2nd IF Amp.
D4 OA90 FM LIMITER
D7 OA90 AM DET & AGC
D5,6 20A90 × 2 FM DET
TR3 2SC829 FM OSC.
D1 SC-15 FM AFC
TR21~24 2SB473 × 4 OUTPUT
TR13,14 2SA564 × 2 1st AF Amp.
TR15,16 2SB173 × 2 2nd AF Amp.
TR17,18 2SB173 × 2 3rd AF Amp.
TR19,20 2SB176 ×2 AF 4th Amp.
TR8 2SC829 DISTRIBUTOR
TR9 2SC829 19KHz Amp.
D8,9 20A90 × 2 DOUBLER
TR10 2SA101 38KHz Amp.
D10~13 20A90 × 4 L-R DET
TR11 2SC829 DC Amp.
TR12 2SB178 SWITCHING
D15 10DC-1
D16 10DC-1R
RECT
SPEAKER 16Ω (L)
SPEAKER 16Ω (R)
PH
AUX
PU
REC OUT
INDL
TR1 Drein Gate Source
TR2~TR9 TR11 Base Collector Emitter
TR13 TR14 Base Collector Emitter
TR10 TR12 TR15~TR20 Base Collector Emitter Dot
TR21~TR24
L5
L1
T1 T2
T3~T8
T10~T12
Bottom View
S1-1 S1-2 S1-3 S1-4
① COMMON
② AUX
③ PH
④ FM
⑤ FM STEREO
⑥ AM
S2 S3 S4
240V-210V-125V-110V
+11.5V

R	36 136 37 38 2 1 4 5 6 3 39 41 7 8 40 122 43 13 9 42 44 49 11 45 46 47 14 16 48 15 10 50 12 51 17 52 54 55 56 53 18 19 135 20 21 22 128 129 58 59 23 66 61 132 79 62 133 81 63 127 64 65 66 67 24 68 69 25 137 131 73 72 130 70 57 34 74 75 77 76 26 78 80 82 83 27 71 73 28 88 89 125 86 87 90 93 91 92 84 94 95 85 126 29 30 31 98 99 35 32 100 103 101 34 102 96 120 121 111 104 105 112 113 114 97 106 107 108 109 115 116 117 118 123 124
C	37 39 10 1 40 2 3 11 4 41 42 12 13 43 105 106 44 5 6 7 14 15 8 49 16 45 17 50 103 46 55 18 19 44 48 107 21 20 22 104 53 54 57 102 24 56 25 27 26 110 61 58 52 68 28 29 62 64 63 65 51 66 69 67 108 109 31 70 71 72 73 32 74 75 76 100 77 78 79 101 81 82 99 59 35 60 84 36 85 33 86 34 87 80 91 83 88 97 98 89 92 90 93 94 95 96
L	7 1 8 2 4 3 5 6 9 10
T	10 11 1 2 12 3 4 5 6 9 7 8 15 13 14
S	2 1-2 1-1 1-3 1-4 4 3 5

Notes:

1. S1-1 ~ S1-4 : Band Selector Switch in "FM STEREO" position.
2. S2 : FM AFC ON-OFF Switch in "ON" position.
3. S3 : Power Source Switch in "OFF" position.
4. S4 : Shut Off Switch in "OFF" position.
5. S5 : Power Source Voltage Selector in "110V" position.

5. DC voltages measured with vacuum tube voltmeter under no signal condition in "FM" position.
Measured DC voltages shown polarity with respect to chassis ground.

TR5 ☐ .... AM position
TR1 ~ 9 .... FM position
TR15 ~ 24
No Mark .... FM position
TR10 ~ 14 ( ) .... FM stereo position

POSITIVE LINE
GROUND LINE
NEGATIVE LINE (AF CIRCUIT)
NEGATIVE LINE (IF, RF & FM MPX CIRCUIT)

NATIONAL RADIO PHONOGRAPH

PARTS IDENTIFICATION

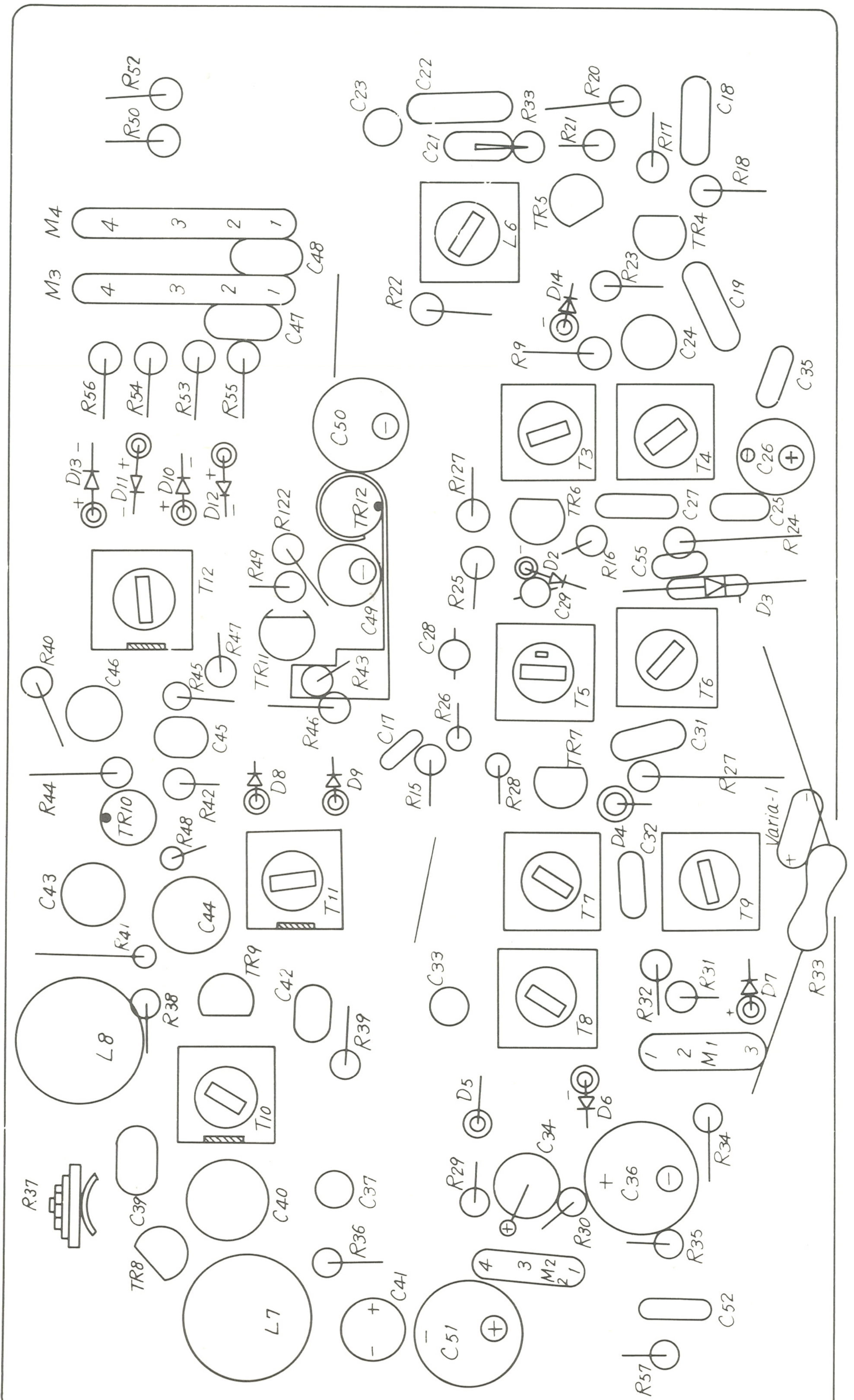

R52
R50
C23
C22
R33
R20
C18
C21
R21
R17
R18
M4
4
3
2
1
M3
C48
L6
TR5
TR4
R22
R23
D14
C47
C19
R9
C24
C35
R56
R54
R53
R55
C50
T3
T4
C26
D13
D11
D10
D12
R122
TR12
R127
TR6
C27
C25
R24
T12
R49
C49
R25
D2
R16
C55
C29
D3
R40
R47
C28
C46
R45
TR11
R43
T5
T6
R46
C45
R26
C17
C31
R44
D8
D9
R15
R28
TR7
R27
TR10
R42
D4
Varia-1
R48
C32
C43
C44
T11
T7
T9
R41
C33
R38
TR9
C42
R32
R31
D7
R33
L8
R39
T8
M1
D5
D6
T10
R34
C34
R37
C39
C40
C37
R29
C36
R30
R35
TR8
R36
M2
C41
L7
C51
C52
R57

Fig. 15 IF (FM & AM) AND MULTIPLEX SECTION

PARTS IDENTIFICATION

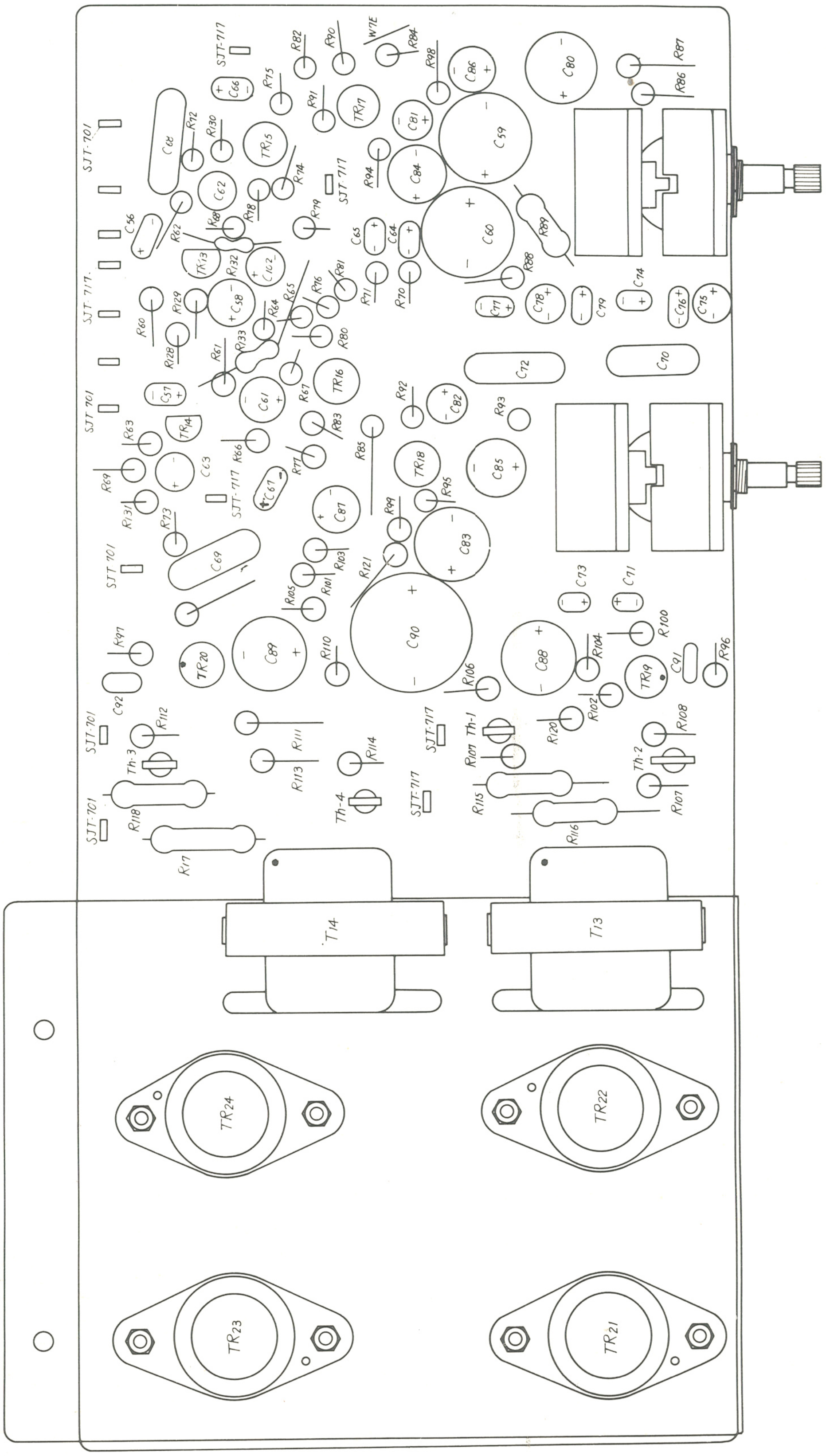

SJT-717
R82
R90
W7E
R84
R98
C86
C80
R87
R86
C66
R75
R91
TR17
C81
C59
SJT-701
C68
R72
R130
TR15
R74
R94
C84
C62
SJT 717
C56
R62
R68
R78
R79
C65
C64
C60
R89
TR13
R132
C102
R81
R76
R88
R71
R70
C74
SJT 717
R60
R129
C58
R64
R65
C77
C78
C79
C76
C75
R128
R133
R80
C72
C70
R61
C57
C61
R67
TR16
R92
C82
R93
SJT 701
R63
TR14
R83
R85
R69
C63
R66
SJT-717
C67
R77
TR18
R95
C85
R131
R73
C87
R99
C83
SJT 701
C69
R105
R101
R103
R121
C73
C71
C90
R97
TR20
C89
R110
R106
C88
R104
R100
TR19
C91
R96
C92
R112
SJT-701
R111
R120
R102
R108
SJT-717
Th-1
Th-3
R113
R114
R109
Th-2
R118
R115
Th-4
SJT-717
R107
SJT-701
R116
R117
T14
T13
TR24
TR22
TR23
TR21

Fig. 16 AUDIO SECTION

CIRCUIT BOARD WIRING VIEW MODEL SG-970A

TR23

C	–11.5V
B	–0.16V
E	–0.02V
Ic	1.5mA

TR21

C	–11.5V
B	–0.16V
E	–0.02V
Ic	1.5mA

TR24

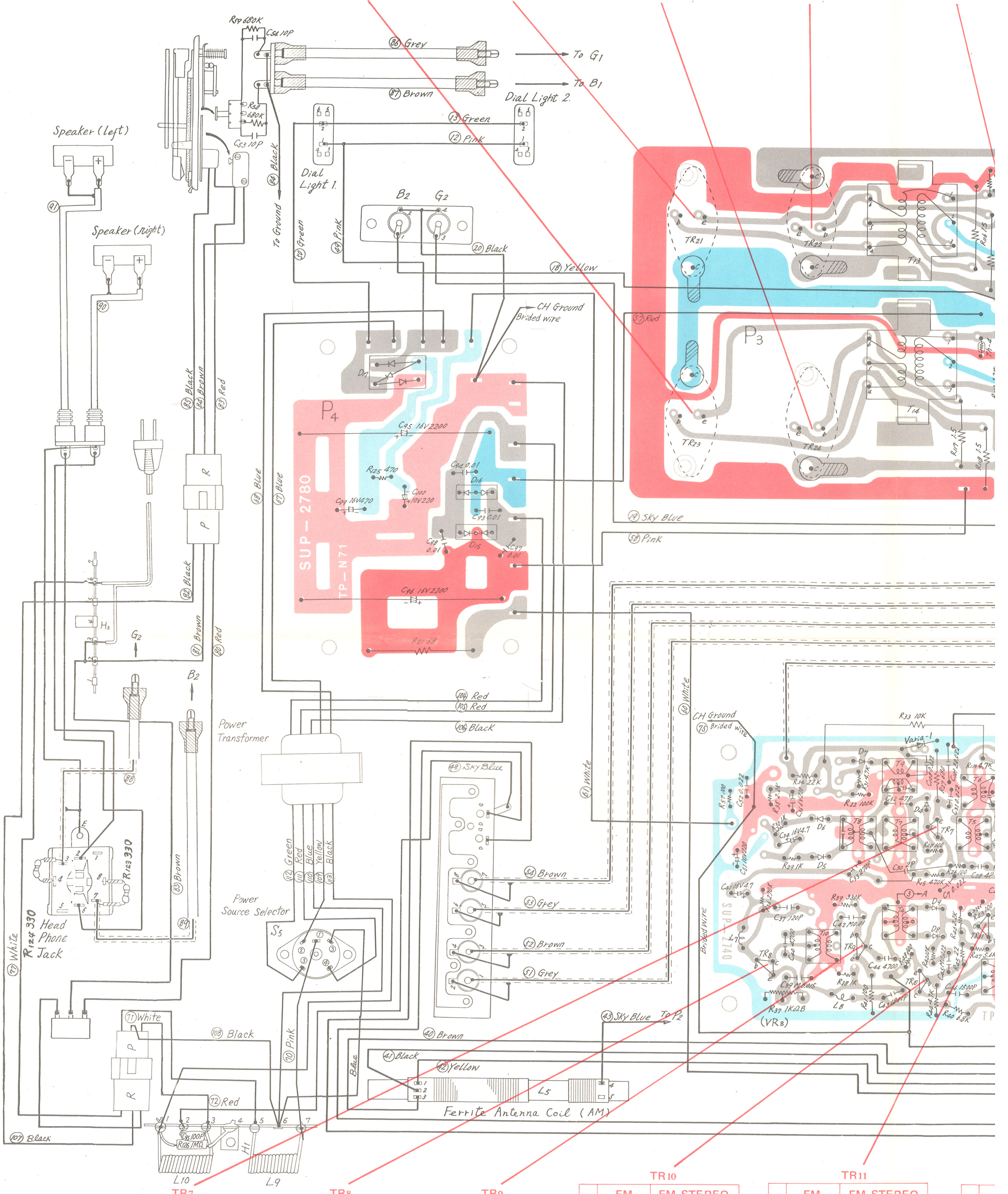
C	0V
B	10.4V
E	11.5V
Ic	1.5mA

TR22

C	0V
B	10.4V
E	11.5V
Ic	1.5mA

TR20

C	–10V
B	–2.15V
E	–2V
Ic	5mA


R57 680K
C54 10P
R58 680K
C53 10P
86 Grey
87 Brown
To G1
To B1
Dial Light 2.
13 Green
12 Pink
Dial Light 1.
84 Black
To Ground
Speaker (left)
91
Speaker (right)
90
B2
G2
20 Black
18 Yellow
22 Green
24 Pink
CH Ground
Brided wire
57 Red
TR21
TR22
TR23
TR24
T13
T14
P3
R46 1.5
R49 1.5
R48 1.5
P4
D17
C95 16V2200
R25 470
C92 0.01
D16
C99 16V470
C100 10V220
C93 0.01
C98 0.01
D15
C97 0.01
C96 16V2200
R51 68
SUP – 2780
TP – N71
93 Black
94 Brown
95 Red
48 Blue
47 Blue
92 Black
81 Brown
80 Red
19 Sky Blue
58 Pink
R
P
H3
G2
B2
104 Red
105 Red
106 Black
Power Transformer
60 White
CH Ground
73 Brided wire
61 White
88
E
R123 330
R124 330
Head Phone Jack
83 Brown
89
77 White
Green
Red
Blue
Yellow
Black
Power Source Selector
S5
48 Sky Blue
54 Brown
53 Grey
52 Brown
51 Grey
R33 10K
Varia-1
D7
R36 3.3K
R32 100K
C32 47P
R29 1K
D5
C34 16V4.7
D6
T8
T7
T5
TR7
R5 470K
C35 2P
R39 330K
C42 MM0.01
C37 120P
C41 16V4.7
L7
TR8
TR9
C44 4700
D8
TR6
C39 MM0.015
R38 1K
L8
R37 1KΩB (VR8)
R40 8.2K
C45 1500P
Brided wire
SUP – 2140
R57 100
71 White
108 Black
70 Pink
40 Brown
43 Sky Blue
To T2
Blue
41 Black
42 Yellow
L5
Ferrite Antenna Coil (AM)
72 Red
107 Black
C106 100P
R126 1MΩ
H1
L10
L9

TR7

C	–0.08V
B	–4.5V
E	–5.1V
Ie	0.75mA

TR8

C	–2V
B	–3V
E	–3.8V
Ic	2mA

TR9

C	0V
B	–4.8V
E	–5.4V
Ic	2.5mA

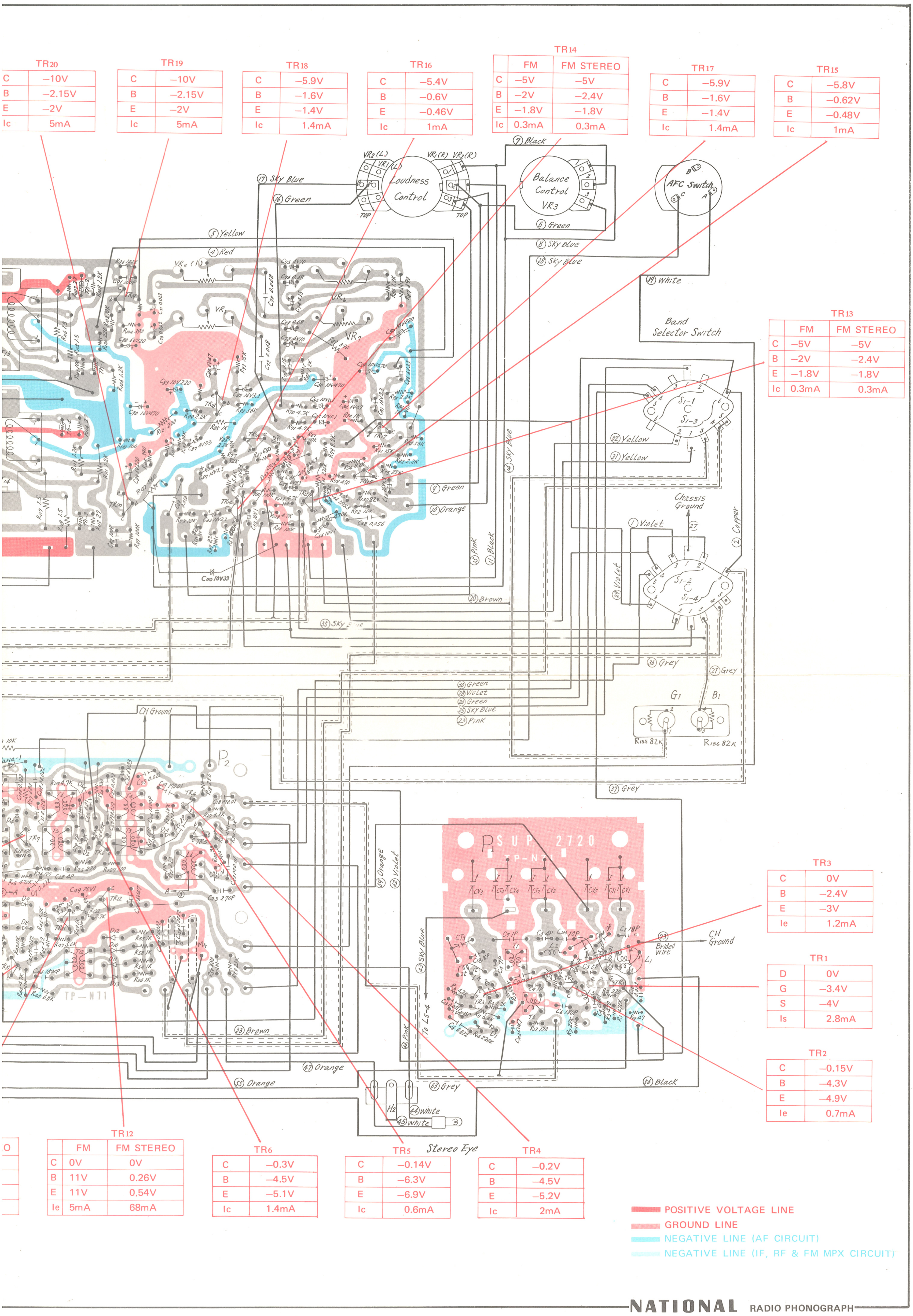
TR10

	FM	FM STEREO
C	–5.9V	–5.6V
B	2.4V	–0.27V
E	1.6V	–0.08V
Ic	0mA	0.8mA

TR11

	FM	FM STEREO
C	11V	0.26V
B	0V	0.9V
E	0.4V	0.2V
Ic	3.6mA	1.8mA

C	0
B	1
E	1
Ie	5


VR2 (L)
VR1 (L)
Loudness Control
VR1 (R)
VR2 (R)
TOP
⑦ Black
Balance Control VR3
⑥ Green
AFC Switch
B
C
A
⑰ Sky Blue
⑯ Green
⑤ Yellow
④ Red
⑧ Sky Blue
㊳ Sky Blue
㊾ White
Band Selector Switch
S1-1
S1-3
S1-2
S1-4
㉜ Yellow
㉛ Yellow
⑨ Green
⑩ Orange
Chassis Ground
① Violet
② Copper
㉔ Sky Blue
㉟ Pink
⑪ Black
㉙ Violet
⑳ Brown
㉝ Sky Blue
㊱ Grey
㉗ Grey
㉚ Green
㉘ Violet
㉖ Green
㉕ Sky Blue
㉓ Pink
G1
B1
R135 82K
R136 82K
㊲ Grey
CH Ground
P2
VR7
VR6
VR5
C110 10V33
㊴ Orange
㊷ Violet
PSUP 2720
TP-N11
TP-N71
CV3
CT4
CV4
CT2
CV2
CV5
CT1
CV1
㊸ Sky Blue
To L5-4
㊵ Pink
㊶ Brided Wire
CH Ground
L1
㉝ Brown
㊼ Orange
㉟ Orange
㊸ Grey
㊹ White
㊺ White
H2
③
Stereo Eye
⑯ Black

TR20

C	–10V
B	–2.15V
E	–2V
Ic	5mA

TR19

C	–10V
B	–2.15V
E	–2V
Ic	5mA

TR18

C	–5.9V
B	–1.6V
E	–1.4V
Ic	1.4mA

TR16

C	–5.4V
B	–0.6V
E	–0.46V
Ic	1mA

TR14

	FM	FM STEREO
C	–5V	–5V
B	–2V	–2.4V
E	–1.8V	–1.8V
Ic	0.3mA	0.3mA

TR17

C	–5.9V
B	–1.6V
E	–1.4V
Ic	1.4mA

TR15

C	–5.8V
B	–0.62V
E	–0.48V
Ic	1mA

TR13

	FM	FM STEREO
C	–5V	–5V
B	–2V	–2.4V
E	–1.8V	–1.8V
Ic	0.3mA	0.3mA

TR3

C	0V
B	–2.4V
E	–3V
Ie	1.2mA

TR1

D	0V
G	–3.4V
S	–4V
Is	2.8mA

TR2

C	–0.15V
B	–4.3V
E	–4.9V
Ie	0.7mA

O

TR12

	FM	FM STEREO
C	0V	0V
B	11V	0.26V
E	11V	0.54V
Ie	5mA	68mA

TR6

C	–0.3V
B	–4.5V
E	–5.1V
Ic	1.4mA

TR5

C	–0.14V
B	–6.3V
E	–6.9V
Ic	0.6mA

TR4

C	–0.2V
B	–4.5V
E	–5.2V
Ic	2mA

🟥	POSITIVE VOLTAGE LINE
🟥	GROUND LINE
🟦	NEGATIVE LINE (AF CIRCUIT)
🟦	NEGATIVE LINE (IF, RF & FM MPX CIRCUIT)

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ALIGNMENT INSTRUCTIONS

FREQUENCY & DISTANCE ON DIAL SCALE

To accurately align to the proper frequencies on the dial scale, refer to Table at right and mark the edge of the dial scale accordingly, using the "Start Point" mark on the dial scale as a reference point.

Table

Band	Frequency	Distance from "Start Point"
AM	550 kHz	9.2 mm
	1500 kHz	82.8 mm
FM	90 MHz	15.44 mm
	106 MHz	75.04 mm

Notes:
1. Loudness Control .... Maximum (AM-IF & RF, FM-RF), Minimum (FM-IF)
2. Bass Control .... Maximum
3. Treble Control .... Maximum
4. Band Selector .... AM, FM, FM STEREO
5. AFC Switch .... OFF (FM-IF & RF)
6. Output of signal generator should be no higher than necessary to obtain output reading.
7. Make certain that speaker system is connected to the tuner when aligning.

STEP	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING (DISTANCE)	INDICATOR (VTVM or SCOPE)	ADJUST	REMARKS
	CONNECTION	FREQUENCY				
AM-IF & RF ALIGNMENT						
1	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz 30% Mod. with 400 Hz.	Point of noninterference (on/about 600 kHz)	Output meter across speaker jack (L). (Imp. 16Ω)	T4 (1st IFT) T6 (2nd IFT) T9 (3rd IFT)	Adjust for maximum output.
2	Fashion loop of several turns of wire and radiate signal into loop of receiver.	550 kHz 30% Mod. with 400 Hz.	550 kHz (9.2 mm)	Output meter across speaker jack (L). (Imp. 16Ω)	L5 (ANT Coil) L6 (OSC Coil)	Adjust for maximum output by sliding coil (L5) along ferrite core.
3	Fashion loop of several turns of wire and radiate signal into loop of receiver.	1500 kHz 30% Mod. with 400 Hz.	1500 kHz (82.8 mm)	Output meter across speaker jack (L). (Imp. 16Ω)	CT4 (ANT Trimmer) CT5 (OSC Trimmer)	Adjust for maximum output. Repeat steps (2) and (3).
* 1. **Cement antenna bobbin with wax after completing alignment.** 2. **Make certain that speaker system is connected to tuner when aligning.**						
FM-IF AND DETECTOR ALIGNMENT						
1	High side thru. .001mfd to point TP1. Common to chassis.	10.7 MHz (400 kHz SWP.)	Point of noninterference (on/about 98 MHz)	Connect vert. amp. of scope to point TP2. Common to chassis.	T1 (FM 1st IFT) T2 (FM 2nd IFT) T3 (FM 3rd IFT) T5 (FM 4th IFT) T7 (FM Disc.IFT)	Adjust for maximum amplitude and proper linearity between ±100 kHz markers. (Refer to Fig. 18)
2	High side thru. .001mfd to point TP1. Common to chassis.	10.7 MHz (400 kHz SWP.)	Point of noninterference (on/about 98 MHz)	Connect vert. amp. of scope to point TP3. Common to chassis.	T8 (FM Disc.IFT)	Adjust for maximum amplitude and proper linearity between ±100 kHz markers. (Refer to Fig. 19)
* 1. **When aligning step 1, unsolder lead between TP2-a & TP2-b before alignment and resolder it after step 1 alignment.** 2. **Turn the core of T8 (FM Disc. IFT) fully counterclockwise before alignment.**						
FM-RF ALIGNMENT						
1	Connect to EXT. FM antenna terminal through Dummy antenna. Common to chassis. (Refer to Fig. 20)	90 MHz 30% Mod. with 400 Hz.	90 MHz (15.44 mm)	Output meter across speaker jack (L). (Imp. 16Ω)	L4 (FM OSC Coil) L1 (FM ANT Coil) L2 (FM Collector Coil)	Adjust for maximum output.
2	Connect to EXT. FM antenna terminal through Dummy antenna. Common to chassis. (Refer to Fig. 20)	106 MHz 30% Mod. with 400 Hz	106 MHz (75.04 mm)	Output meter across speaker jack (L). (Imp. 16Ω)	CT3 (FM OSC Trimmer) CT1 (FM ANT Trimmer) CT2 (FM Collector Trimmer)	Adjust for maximum output. Repeat steps (1) and (2).
* **As three output readings will be present, adjustments must be made at center frequency.**						

ALIGNMENT INSTRUCTIONS

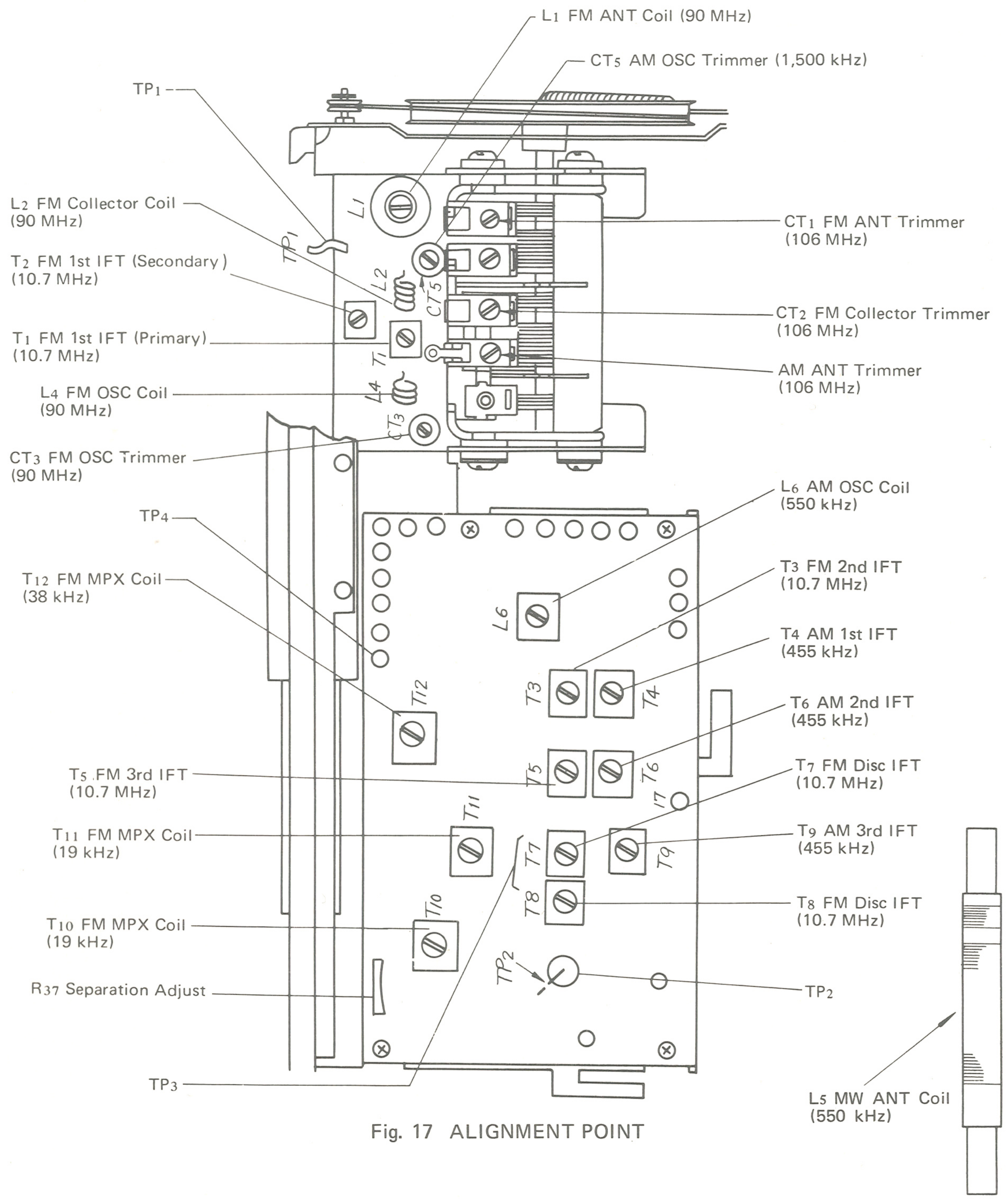

L1 FM ANT Coil (90 MHz)
CT5 AM OSC Trimmer (1,500 kHz)
TP1
L2 FM Collector Coil (90 MHz)
T2 FM 1st IFT (Secondary) (10.7 MHz)
T1 FM 1st IFT (Primary) (10.7 MHz)
L4 FM OSC Coil (90 MHz)
CT3 FM OSC Trimmer (90 MHz)
CT1 FM ANT Trimmer (106 MHz)
CT2 FM Collector Trimmer (106 MHz)
AM ANT Trimmer (106 MHz)
L6 AM OSC Coil (550 kHz)
TP4
T12 FM MPX Coil (38 kHz)
T3 FM 2nd IFT (10.7 MHz)
T4 AM 1st IFT (455 kHz)
T6 AM 2nd IFT (455 kHz)
T5 FM 3rd IFT (10.7 MHz)
T7 FM Disc IFT (10.7 MHz)
T11 FM MPX Coil (19 kHz)
T9 AM 3rd IFT (455 kHz)
T10 FM MPX Coil (19 kHz)
T8 FM Disc IFT (10.7 MHz)
R37 Separation Adjust
TP2
TP3
L5 MW ANT Coil (550 kHz)
L1
L2
CT5
T1
L4
CT3
L6
T12
T3
T4
T5
T6
T11
T7
T9
T8
T10
TP2

Fig. 17 ALIGNMENT POINT

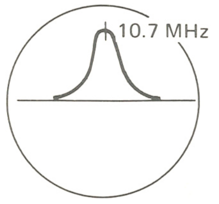


Fig. 18

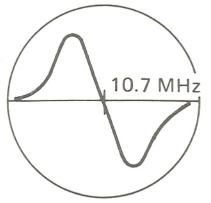


Fig. 19

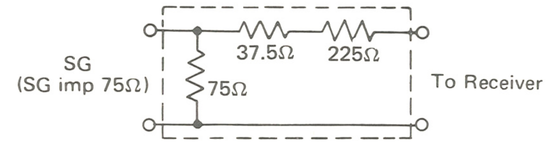

SG
(SG imp 75Ω)
37.5Ω
225Ω
75Ω
To Receiver

Fig. 20 FM DUMMY ANTENNA

ALIGNMENT INSTRUCTIONS

FM STEREO ALIGNMENT

Notes:

1. Stereo Modulator . . Connect Stereo Modulator to EXT. Mod. terminal of signal generator.
2. Signal Generator . . Modulation Rate of 19 kHz Pilot Signal . . 10%
   Output Level . . . . 30 dB
   Frequency . . . . Approximately 89.5 MHz
3. Tuner . . . . Approximately 89.5 MHz

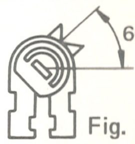


Fig. 21

R37 SEPARATION CONTROL

19 kHz AMP. ALIGNMENT

EQUIPMENT CONNECTION		ADJUST	REMARKS
SIGNAL GENERATOR	OSCILLOSCOPE		
Connect to EXT FM antenna terminal through dummy antenna. (Refer to Fig. 19)	Connect vert. Amp. of scope to point TP4. Common to chassis.	T10 (19 kHz Coil) T11 (19 kHz Coil) T12 (38 kHz Coil)	Adjust T10 – T12 for maximum oscilloscope pattern of 38 kHz.

*** When aligning, set separation control (R37) as shown in Fig. 21.**

SEPARATION ALIGNMENT

Notes:

1. Signal Generator . . . . Modulation Rate of 19 kHz Pilot Signal 10%
   Modulation Rate of Right and Left Signal 27%
   Output Level . . . . 60 dB
2. Balance Control . . . . Adjust balance control so that output level from both units becomes equal.

EQUIPMENT CONNECTION			ADJUST	REMARKS
SIGNAL GENERATOR	VTVM	OSCILLOSCOPE		
Connect to EXT FM antenna terminal through dummy antenna. (Refer to Fig. 19)	Connect across speaker jack. (left side) (Imp. 16Ω)	Connect to terminals of VTVM.	T12 (MPX Coil) T10 (MPX Coil)	Adjust T12 & T10 for minimum indication on VTVM from the left side output when the right side of stereo modulator is modulated.
Connect to EXT FM antenna terminal through dummy antenna. (Refer to Fig. 19)	Connect across speaker jack. (left side) (Imp. 16Ω)	Connect to terminals of VTVM.	R37 (Separation Control)	Adjust R37 for minimum indication on VTVM from the left side output when the right side of stereo modulator is modulated.

*** Before separation aligning, disconnect lead between TP4 and Oscilloscope (A).**

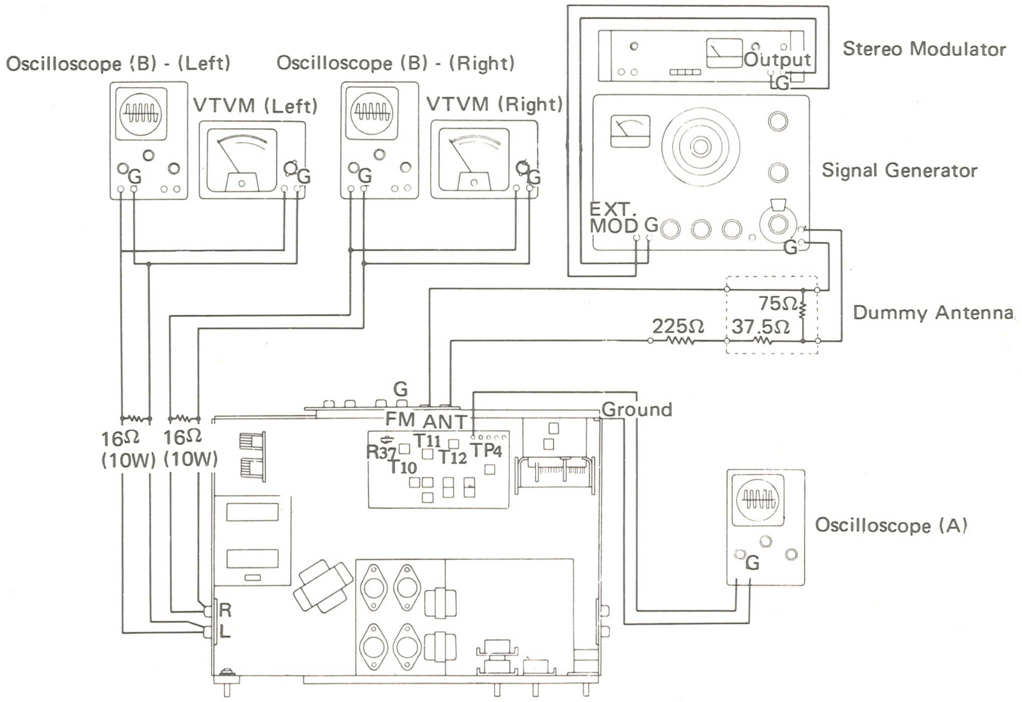


Fig. 22 RECOMMENDED EQUIPMENT CONNECTION FOR SEPARATION ALIGNMENT

SERVICING THE RECORD CHANGER

SPECIFICATIONS

Operating Voltage	120 Volts, AC
Turntable Speeds	16-2/3, 33-1/3, 45 and 78 RPM
Record Load	Up to six 7″, 10″ or 12″ records with any intermix at the same speed.

LUBRICATION

The Record Changer mechanism is well lubricated before leaving the factory; after prolonged use, it is advisable to relubricate certain parts.

A medium grease should be applied to the points as shown in Fig. 27.

ADJUSTMENT

Stylus Set-Down: During automatic operation the stylus sets down 1/8 inch from edge of record. Turning the stylus set down adjustment screw counter-clockwise causes the stylus to set down further in from the edge of the record. (See Fig. 24)

Pickup Arm Height: To raise, turn screw head by hand counter-clockwise; to lower, turn screw head clockwise. Adjust stylus to clear a full stack of records by 1/8 inch. (See Fig. 24)

Stylus Pressure: The needle pressure is adjusted at the factory for the correct pressure of 6 grams. Move the spring to different holes to set other pressure. (See Fig. 24)

DISASSEMBLY INSTRUCTIONS

1. **Turntable Assembly**
   Remove Circlip and carefully lift Turntable Assembly off its bearing. When replacing Turntable Assembly, push the Idler Wheel Assembly towards the Turntable Center. This action will allow turntable to drop in position without damaging Idler Wheel.
2. **Record Support Arm Assembly**
   Make sure the Unit has completed its cycle and the Pickup Arm returned to the Rest. Remove the Circlip and Washer from the bottom of the Record Support Arm Spindle. The Record Support Arm Assembly can then be removed from the top of the Unit.
3. **Pickup Arm Assembly**
   The Unit should be disconnected from Power supply before attempting to remove the Pickup Arm Assembly. The Pickup Arm leads should be detached from the Terminal. Remove the Pickup Arm Spindle Nut pull the Pickup Arm Assembly upward.
4. **Center Spindle Assembly**
   Move the Feed Link fully toward the Switch, then release. Remove the Center Spindle Assembly.
5. **Idler Wheel**
   Remove the turntable (step 1). Remove Circlip carefully and lift off the Idler Wheel. Replace new Idler Wheel carefully on shaft.
   DO NOT TOUCH OUTSIDE EDGE OF IDLER WHEEL OR LET IT CONTACT ANY OIL OR GREASE.

Note:

Refer to FA-707A Service Manual for more detailed service information.

REPLACING CARTRIDGE AND STYLUS

Stylus

1. Lift the Pickup Arm to a position that will make the stylus accessible.
2. Gently remove Stylus and place new Stylus in to correct position as shown Fig. 26.

Cartridge

1. Lift the Pickup Arm to a position that will make the Cartridge accessible.
2. The leads are removed gently by pulling the connectors off the Cartridge terminals.
3. Gently remove Cartridge by spreading the Cartridge Holder spring as shown in Fig. 25.

SERVICING THE RECORD CHANGER

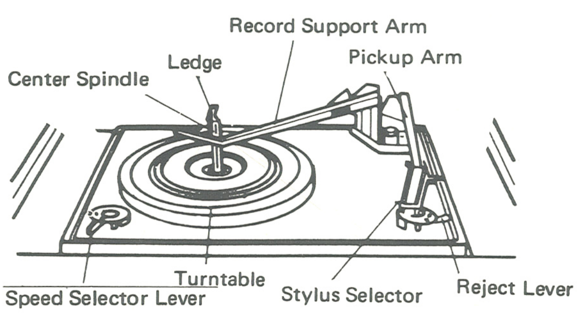

Record Support Arm
Ledge
Pickup Arm
Center Spindle
Turntable
Speed Selector Lever
Stylus Selector
Reject Lever

Fig. 23

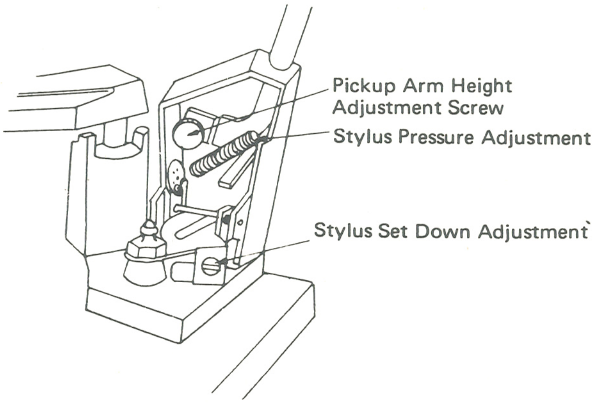

Pickup Arm Height Adjustment Screw
Stylus Pressure Adjustment
Stylus Set Down Adjustment

Fig. 24 PICKUP ARM ADJUSTMENT

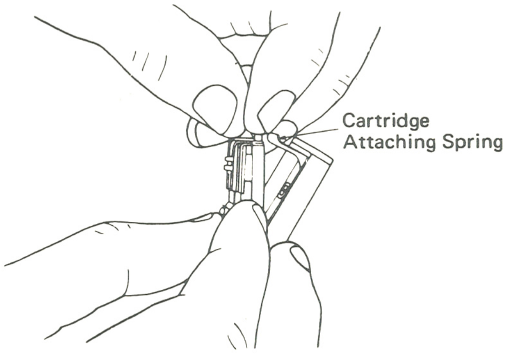

Cartridge Attaching Spring

Fig. 25 REPLACING CARTRIDGE

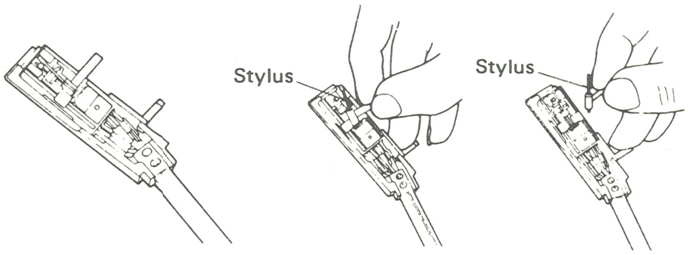

Stylus
Stylus

Fig. 26 REPLACING STYLUS

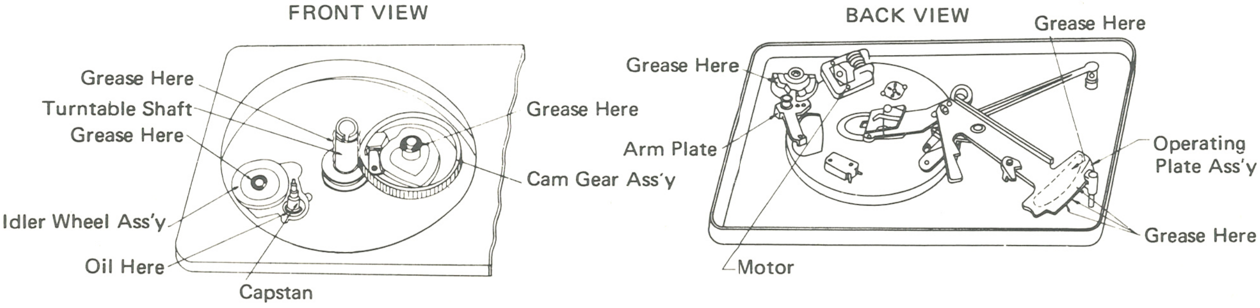

FRONT VIEW
Grease Here
Turntable Shaft
Grease Here
Idler Wheel Ass'y
Oil Here
Capstan
Grease Here
Cam Gear Ass'y
BACK VIEW
Grease Here
Grease Here
Arm Plate
Motor
Operating Plate Ass'y
Grease Here

Fig. 27 LUBRICATION

RECORD CHANGER REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	PER SET (pcs.)	REMARKS
		Automatic Record Changer		
1	FA-707A	Automatic Record Changer	1	
2	FU-PWR009	Circlip	1	
3	FU-TCA013	Turntable Rubber	1	
4	FU-TTA048	Turntable Assembly	1	
5	FU-ADA005	45 RPM Adapter Complete	1	
6	FU-JSA004	Center Spindle	1	
7	FU-KKP036	Speed Change Label	1	
8	FU-MPL082	Escutcheon Moulding	2	
9	FU-KLE009	Lever, Speed & Reject	2	
10	FU-KKP035	Reject Lavel	1	
11	FU-JIK076	Joggle Screw	3	
12	FU-GBS044	Cushion Rubber	3	
13	FU-PWM018	T. T Washer	2	
14	FU-PZB081	Idler off Lever	1	
15	FU-PTD043	Ball Race Assembly	1	
16	FU-PWF009	Felt	1	
17	FU-GAA010	Cam Gear Assembly	1	
18	FU-JBS138	Nut (Pickup)	1	
19	EPU-13TTCD	Pickup Arm Assembly	1	
20	FU-PWF055	Washer, Pickup	2	
21	FU-ETA113	Record Support Arm Assembly	1	
22	FU-NPA012	Actuating Slide Assembly	1	
23	FU-RSA033	Pickup Arm Rest Assembly	1	
24	FU-MPL079	Record Support Housing	1	
25	FU-PWM049	Washer, Record Support	1	
26	FU-BWR081	Spring, Record Support	1	
27	FU-JBS150	Boss, Record Support	1	
28	FU-ETA110	Main Plate Assembly	1	
29	FU-ETA104	Arm Plate Holder Assembly	1	
30	FU-MPL078	Cam, Speed Change	1	
31	FU-GBS039	Rubber Cushion	4	
32	FU-BCP059	Spring (Arm Plate)	1	
33	FU-JSC086	Screw A, Rubber	3	
34	FU-CPC7H-5	Capstan	1	
35	FU-PSP042	Motor Plate Holder	1	
36	FU-JPC091	Stud A	1	
37	FU-FPC092	Stud B	2	
38	2E-10GPL	Motor Assembly	1	
39	FU-IPA010	Idler Wheel Assembly	1	
40	FU-UPA037	Idler Holder Assembly	1	
41	FU-BTN095	Spring (Idler Holder)	1	

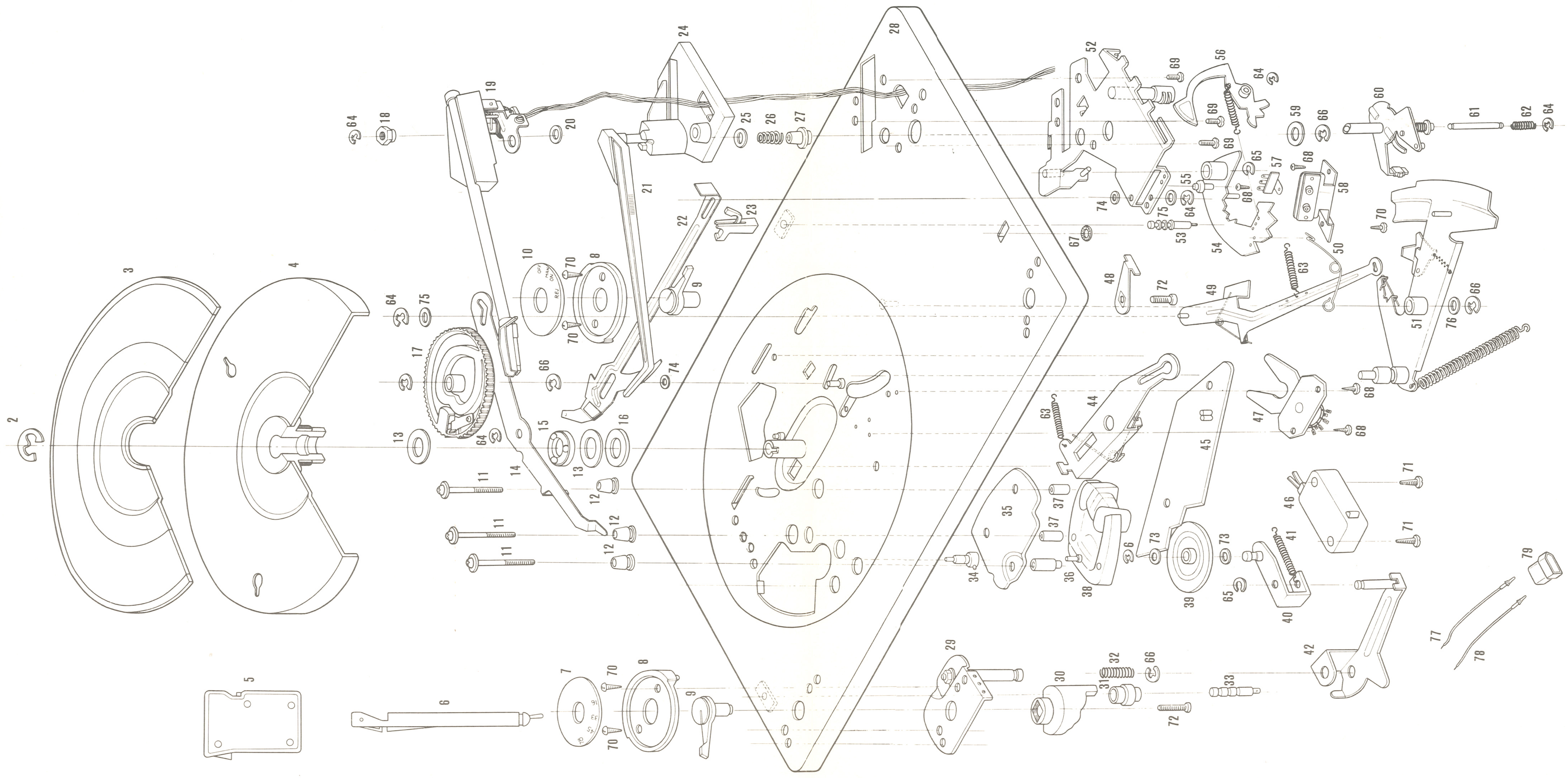
RECORD CHANGER REPLACEMENT PARTS LIST (Cont'd)

REF. NO.	PART NO.	DESCRIPTION	PER SET (pcs.)	REMARKS
42	FU-UPA036	Arm Plate Assembly	1	
43		Not used		
44	FU-ETA105	Feed Link Assembly	1	
45	FU-PFT239	Switch Base Assembly	1	
46	AM-77909	Micro Switch	1	
47	ESL-1812	Short Switch Assembly	1	
48	FU-PDR013	Operation Lever A	1	
49	FU-ETA102	Operation Lever B	1	
50	FU-BWR096	Spring	1	
51	FU-ETA143	Operating Plate Assembly	1	
52	FU-PKA010	Main Sub Plate Assembly	1	
53	FU-JSC087	Screw B, Rubber Cushion	1	
54	FU-ETA142	Index Plate Assembly	1	
55	FU-GPL012	Rubber Cushion	1	
56	FU-ETA106	Selector Assembly	1	
57	FLPV-3N	Terminal	1	
58	FU-ETA133	Socket Holder Assembly	1	
59	FU-PWM059	Washer	1	
60	FU-ETA108	Pickup Plate-A Assembly	1	
61	FU-JIK060	Pickup Arm Raising Spindle Ass'y	1	
62	FU-BCP055	Magnet (Actuating Slide) Spring, Pickup Plate A	1	
63	FU-BTN084	Spring (Feed Link)	1	
64	ER-30S	Circlip	7	
65	ER-40S	Circlip	2	
66	ER-50S	Circlip	4	
67	OHW-30W	Toothed Lock Washer	1	
68	JMP-3060UF$_2$	Self Tapping Screw	4	
69	JMP-3080UF$_2$	Self Tapping Screw	6	
70	JMP-30100UF$_2$	Screw	5	
71	JMP-30160UF$_2$	Self Tapping Screw	2	
72	JMP-40120UF$_2$	Self Tapping Screw	2	
73	FU-PWF062	Washer	2	
74	FU-PWF059	Washer, Actuating Plate	1	
75	KPW-40SB2	Washer	2	
76	FU-PWF019	Washer	1	
77	L18U17R475	Lead Wire A Red	1	
78	L18U17C475	Lead Wire B Brown	1	
79	EPG-1396P1	Plug Housing	1	
	ERD-12TK684	680kΩ 1/6 Watt ±10% Solid	2	
	ECK-D05100MY	10pF 50WV ±1pF Ceramic	2	
	EPC-34TTCD	Cartridge	1	
	ESP-13TTSD	Stylus (Diamond)	1	

REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	PER SET (pcs.)	REMARKS
		TRANSISTORS		
TR1	2SK19	FM RF Amplifier	1	
TR2	2SC920	FM Mixer	1	
TR3	2SC829	FM Oscillator	1	
TR4	2SC829	FM 1st IF Amplifier	1	
TR5	2SC829	AM Converter	1	
TR6	2SC829	FM 2nd IF Amp. & AM 1st IF Amp.	1	
TR7	2SC829	FM 3rd IF Amp. & AM 2nd IF Amp.	1	
TR8	2SC829	Distributer	1	
TR9	2SC829	19kHz Amplifier	1	
TR10	2SA101	38kHz Amplifier	1	
TR11	2SC829	DC Amplifier	1	
TR12	2SB178	DC Switching	1	
TR13, 14	2SA564	1st AF Amplifier (L & R)	2	
TR15, 16	2SA173	2nd AF Amplifier (L & R)	2	
TR17, 18	2SA173	3rd AF Amplifier (L & R)	2	
TR19, 20	2SB176	4th AF Amplifier (L & R)	2	
TR21, 22, 23, 24	2SB473	Power Output (L & R)	4	
		DIODES		
D1	SC-15	AFC	1	
D2, 3, 4	0A90	FM AGC	3	
D5, 6	0A90	FM Discriminator (pair)	2	
D7	0A90	AM Detector	1	
D8, 9	0A90	Doubler (pair)	2	
D10, 11, 12, 13	0A90	L-R Detector (pair) . . . D10, 11 & D12, 13	4	
D14	0A90	AM D. AGC	1	
D15	10DC-1	Rectifier	1	
D16	10DC-1R	Rectifier	1	
D17	12B-2B1P-M	Rectifier	1	
Va-1	EYV-320D1R2J2	AOC (Ceramic Diode Varister)	1	
		THERMISTORS		
TH1~4	ERT-D2FGK750S	Temperature Compensator	4	
		COILS AND TRANSFORMERS		
L1	SLA-4P6	FM Antenna Coil	1	New
L2	SLD-4Y4	FM Collector Coil	1	New
L3	SLQ-Y11G-2	IF Trap Coil	1	

EXPLODED VIEW OF RECORD CHANGER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REPLACEMENT PARTS LIST (Cont'd)

REF. NO.	PART NO.	DESCRIPTION	PER SET (pcs.)	REMARKS				
L4	SLO-4Y2	FM Oscillator Coil	1					
L5	SLF-2E10	AM Ferrite Antenna Coil	1					
L6	SLO-2C12M	AM Oscillator Coil	1					
L7, 8	SLQ-V394-2Y	Multiplex Filter	2					
L9, 10	SLQ-Y35G-2D	RFC	2					
T1, 2	SLI-4B102	FM 1st & 2nd IFT	2					
T3	SLI-4C32M	FM 3rd IFT	1					
T4	SLI-2C14M	AM 1st IFT	1					
T5	SLI-4C22M	FM 4th IFT	1					
T6	SLI-2C22M	AM 2nd IFT	1					
T7	SLI-4C56M	FM Disc. IFT	1					
T8	SLI-4C58M	FM Disc. IFT	1					
T9	SLI-2C42M	AM 3rd IFT	1					
T10	SLM-2C4K	Multiplex 19kHz Coil	1					
T11	SLM-2C2K	Multiplex 19kHz Coil	1					
T12	SLM-3C2K	Multiplex 38kHz Coil	1					
T13, 14	SLT-3H4	Input Transformer	2					
T15	SLT-5L18-D	Power Transformer	1	New				
		COMPONENT COMBINATION						
M1	EXA-F203Z471	0.02μFZ, 470Ω (two)	1					
M2	EXA-5DL04C	4.7kΩ (two), 330pF (three)	1					
M3, 4	EXA-6FC02	22kΩ (two), 10kΩ, 200pF (two), 410pF	2					
		RESISTORS		RF	IF	AF	P.S	CH
R107, 109, 112, 114	ERD-14VJ270	27Ω 1/4Watt ±5% Carbon	4			4		
R10	ERD-14VJ470	47Ω 1/4Watt ±5% Carbon	1	1				
R19, 26, 28, 41, 43, 48, 57, 127, 110	ERD-14VJ101	100Ω 1/4Watt ±5% Carbon	9		8	1		
R12	ERD-14VJ121	120Ω 1/4Watt ±5% Carbon	1	1				
R11, 18, 22, 25, 120, 121	ERD-14VJ221	220Ω 1/4Watt ±5% Carbon	6	1	3	2		
R24	ERD-14VJ331	330Ω 1/4Watt ±5% Carbon	1		1			
R87, 104, 105	ERD-14VJ391	390Ω 1/4Watt ±5% Carbon	3			3		
R3, 78, 80, 125	ERD-14VJ471	470Ω 1/4Watt ±5% Carbon	4	1		2	1	
R9, 137	ERD-14VJ561	560Ω 1/4Watt ±5% Carbon	2	1	1			
R27, 65, 67	ERD-14VJ681	680Ω 1/4Watt ±5% Carbon	3		1	2		
R21, 29, 30, 38, 49, 53, 54, 55, 56, 84, 85, 94, 95	ERD-14VJ102	1kΩ 1/4Watt ±5% Carbon	13		9	4		

REPLACEMENT PARTS LIST (Cont'd)

REF. NO.	PART NO.	DESCRIPTION	PER SET (pcs.)	REMARKS				
				RF	IF	AF	P.S	CH
R86, 88, 106, 108, 111, 113	ERD-14VJ122	1.2kΩ 1/4Watt ±5% Carbon	6			6		
R23	ERD-14VJ182	1.8kΩ 1/4Watt ±5% Carbon	1		1			
R4, 35, 45, 46, 52, 82, 83, 98, 99	ERD-14VJ222	2.2kΩ 1/4Watt ±5% Carbon	9	1	4	4		
R122	ERD-14VJ272	2.7kΩ 1/4Watt ±5% Carbon	1		1			
R17, 20, 100, 101	ERD-14VJ332	3.3kΩ 1/4Watt ±5% Carbon	4		2	2		
R6, 31, 70, 71, 128, 129, 134	ERD-14VJ472	4.7kΩ 1/4Watt ±5% Carbon	7	1	2	4		
R5, 47, 64, 66	ERD-14VJ562	5.6kΩ 1/4Watt ±5% Carbon	4	1	1	2		
R16, 40, 136	ERD-14VJ682	6.8kΩ 1/4Watt ±5% Carbon	3	1	2			
R68, 69, 74, 76, 79	ERD-14VJ822	8.2kΩ 1/4Watt ±5% Carbon	5			5		
R42, 72, 73, 81, 102, 103	ERD-14VJ103	10kΩ 1/4Watt ±5% Carbon	6		1	5		
R91, 93	ERD-14VJ153	15kΩ 1/4Watt ±5% Carbon	2			2		
R7, 34	ERD-14VJ223	22kΩ 1/4Watt ±5% Carbon	2	1	1			
R44	ERD-14VJ473	47kΩ 1/4Watt ±5% Carbon	1		1			
R90, 92	ERD-14VJ563	56kΩ 1/4Watt ±5% Carbon	2			2		
R8	ERD-14VJ683	68kΩ 1/4Watt ±5% Carbon	1	1				
R75, 77, 130, 131	ERD-14VJ823	82kΩ 1/4Watt ±5% Carbon	4			4		
R13, 32, 60, 61, 96, 97	ERD-14VJ104	100kΩ 1/4Watt ±5% Carbon	6	1	1	4		
R2, 14, 36, 132, 133	ERD-14VJ224	220kΩ 1/4Watt ±5% Carbon	6	2	2	2		
R39	ERD-14VJ334	330kΩ 1/4Watt ±5% Carbon	1		1			
R1, 15, 62, 63	ERD-14VJ474	470kΩ 1/4Watt ±5% Carbon	4	1	1	2		
R135	ERD-14TJ330	33Ω 1/4Watt ±5% Carbon	1		1			
R123, 124	ERD-14TJ331	330Ω 1/4Watt ±5% Carbon	2					2
R89	ERD-14TJ391	390Ω 1/4Watt ±5% Carbon	1			1		
R33	ERD-14TJ103	10kΩ 1/4Watt ±5% Carbon	1		1			
R51	ERD-1PZK680	68Ω 1Watt ±10% Carbon	1				1	
R50	ERC-12GK681	680Ω 1/2Watt ±10% Solid	1		1			
R126	ERC-12GM105	1MΩ 1/2Watt ±20% Solid	1					1
R115, 116, 117, 118	ERM-12P1R5	1.5Ω 1/2Watt ±10% Wire	4			4		
		CAPACITORS						
C7, 9	ECC-D05010C	1pF 50WV ±0.25pF Ceramic	2	2				
C20, 30	ECC-D05020C	2pF 50WV ±0.25pF Ceramic	2		2			
C3, 5, 28	ECC-D05040C	4pF 50WV ±0.25pF Ceramic	3	2	1			
C107	ECC-D05050C	5pF 50WV ±0.25pF Ceramic	1	1				
C12, 15, 29	ECC-D05070C	7pF 50WV ±0.25pF Ceramic	3	2	1			

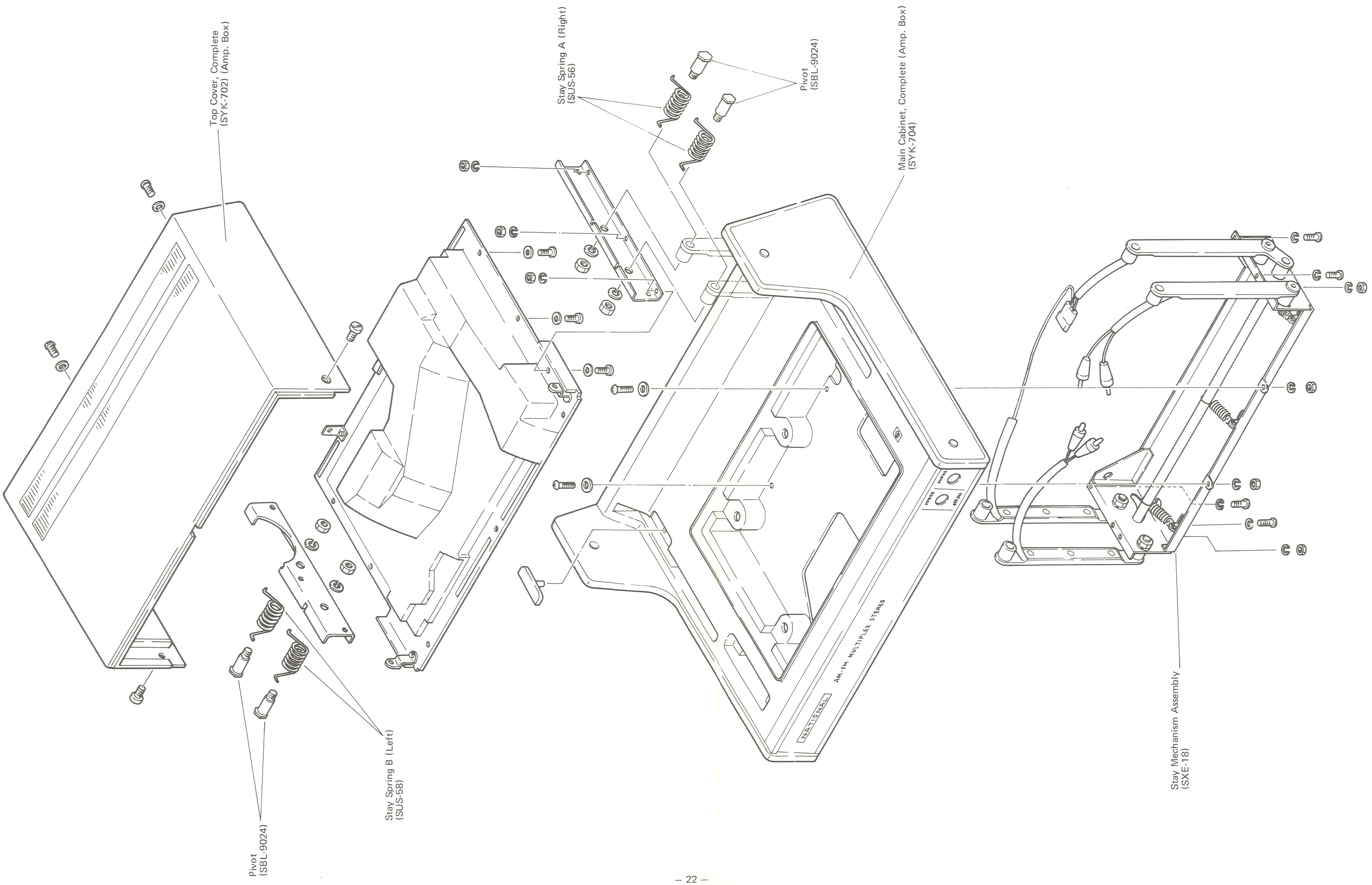
REPLACEMENT PARTS LIST (Cont'd)

REF. NO.	PART NO.	DESCRIPTION				PER SET (pcs.)	REMARKS				
							RF	IF	AF	P.S	CH
C104, 106	ECC-D05100F	10pF	50WV	±1pF	Ceramic	2	2				
C11	ECC-D05150K	15pF	50WV	±10%	Ceramic	1	1				
C1, 14	ECC-D05180K	18pF	50WV	±10%	Ceramic	2	2				
C32	ECC-D05470K	47pF	50WV	±10%	Ceramic	1		1			
C91, 92	ECC-D05101K	100pF	50WV	±10%	Ceramic	2			2		
C2, 4, 13	ECK-D05102MY	0.001μF	50WV	±20%	Ceramic	3	3				
C8, 18, 19, 21, 22	ECK-D05103MY	0.01μF	50WV	±20%	Ceramic	5	1	4			
C55, 93, 94, 97, 98	ECK-D05103ZV	0.01μF	50WV	+80% −20%	Ceramic	5		1		4	
C10, 16, 105, 25, 35, 52, 17, 108, 109	ECK-D05203ZV	0.022μF	50WV	+80% −20%	Ceramic	9	3	6			
C27, 31	UKD-12J223M	0.022μF	50WV	±20%	Ceramic	2		2			
C101	BP-21	100pF	1400WV	+100% −0%	Ceramic	1					1
C37	ECQ-S05121JZ	150pF	50WV	±5%	Styrol	1		1			
C6	ECQ-S05181KZ	180pF	50WV	±10%	Styrol	1	1				
C24, 46	ECQ-S05152KZ	1500pF	50WV	±10%	Styrol	2		2			
C43	ECQ-S05182JZ	1800pF	50WV	±5%	Styrol	1		1			
C23, 33	ECQ-S05271JZ	270pF	50WV	±5%	Styrol	2		2			
C40, 44	ECQ-S05472KZ	4700pF	50WV	±10%	Styrol	2		2			
C47, 48	ECQ-M05222MZ	0.0022μF	50WV	±20%	Polyester	2		2			
C42, 56, 57	ECQ-M05103MZ	0.01μF	50WV	±20%	Polyester	3		1	2		
C39	ECQ-M05153MZ	0.015μF	50WV	±20%	Polyester	1		1			
C45	ECQ-M05223MZ	0.022μF	50WV	±20%	Polyester	1		1			
C68, 69	ECQ-M05563MZ	0.056μF	50WV	±20%	Polyester	2			2		
C70, 72	ECQ-M05683MZ	0.068μF	50WV	±20%	Polyester	2			2		
C75, 78	ECE-A6V10N	10μF	6.3WV		Electrolytic	2			2		
C26, 58, 61, 86, 87	ECE-A6V33N	33μF	6.3WV		Electrolytic	5		1	4		
C84, 85, 103	ECE-A6V47N	47μF	6.3WV		Electrolytic	3	1		2		
C36, 88, 89, 100	ECE-A6V220N	220μF	6.3WV		Electrolytic	3		1	2	1	
C110	ECE-10V33N	33μF	10WV		Electrolytic	1			1		
C51, 80, 83, 100	ECE-A10V220N	220μF	10WV		Electrolytic	4		1	2	1	
C59, 60	ECE-A10V470N	470μF	10WV		Electrolytic	2			2		
C62, 63, 66, 67, 81, 82	ECE-A16V3R3N	3.3μF	16WV		Electrolytic	6			6		
C41, 102	ECE-A16V4R7N	4.7μF	16WV		Electrolytic	2		1	1		
C51	ECE-A16V47N	47μF	16WV		Electrolytic	1		1			
C90, 99	ECE-A16V470N	470μF	16WV		Electrolytic	2			1	1	
C49	ECE-A25V1N	1μF	25WV		Electrolytic	1		1			

REPLACEMENT PARTS LIST (Cont'd)

REF. NO.	PART NO.	DESCRIPTION	PER SET (pcs.)	REMARKS				
				RF	IF	AF	P.S	CH
C34	ECE-B16V4R7N	4.7μF 16WV Electrolytic	1		1			
C95, 96	ECE-B16V2200	2200μF 16WV Electrolytic	2				2	
C64, 65	AL-10V0.1M	0.1μF 10WV Electrolytic	2			2		
C74, 77	AL-10V0.15M	0.15μF 10WV Electrolytic	2			2		
C71, 73	AL-10V0.22M	0.22μF 10WV Electrolytic	2			2		
C76, 79	AL-10V0.68M	0.68μF 10WV Electrolytic	2			2		
		VARIABLE RESISTORS						
VR1, 2	EVG-K1AL35B54	50kΩ Loudness Control	1					
VR3	EVC-B2AL35G15	100kΩ Balance Control	1					
VR4, 5	EVF-N0AL35B54	50kΩ Treble Control (Left & Right)	1					
VR6, 7	EVF-N0AL35B54	50kΩ Bass Control (Left & Right)	1					
VR8 (R37)	EVL-S0AA00B13	1kΩ FM Separation Adjust	1					
		VARIABLE CAPACITORS						
CT1, 2, 4	ECV-5XR27B18S	Tuning Capacitor	1					
CT3, 5	ECV-1ZW10P12	Trimmer Capacitor	2					
		SWITCHES						
S1	ESR-E245F30AE	Band Selector Switch	1					
S2	EVQ-B0GL30	AFC Switch	1					
S3	SSH-10	Power Switch Ass'y	1					
		SPEAKERS						
SP1～2	EAS-16P24SF	16 cm PM Dynamic Speaker, 16Ω	2					
		MISCELLANEOUS						
	SXE-18	Stay Mechanism Assembly	1					
	XAN43T	Dial Light	2	Old Part No. : SVL-205				
	XAN37T100	"Stereo" Light	1	Old Part No. : RVL-212-2				
	SHG-950	Rubber Holder, "Stereo" Light	1					
	SDD-96	Dial Pointer	1					
	SDH-98	Back Plate, Dial	1					
	RDD-60-3	Dial Drum	1					
	RDS-414	Drum Spring	2					
	RDR-14	Pulley D, Dial	8					
	SDT-1242	Tuning Shaft	1					
	SDE-8	Shaft Assembly, Selector Switch	1					
	SME-44	Shaft Connector, Selector Switch	1					
	SR-3P-4	Bushing	1					
	SWJ-30	Pickup Input Cable	1					

EXPLODED VIEW OF CABINET


Top Cover, Complete
(SYK-702) (Amp. Box)
Stay Spring A (Right)
(SUS-56)
Pivot
(SBL-9024)
Main Cabinet, Complete (Amp. Box)
(SYK-704)
AM-FM MULTIPLEX STEREO
NATIONAL
Stay Mechanism Assembly
(SXE-18)
Stay Spring B (Left)
(SUS-58)
Pivot
(SBL-9024)

REPLACEMENT PARTS LIST (Cont'd)

REF. NO.	PART NO.	DESCRIPTION	PER SET (pcs.)	REMARKS
	SYK-67	AC Primary Power Lead (with Stay)	1	New
	SWJ-36	AC Primary Power Lead	1	New
	SWJ-28	Speaker Lead	1	
	SWJ-34	Changer AC Power Lead	1	
	RJP-5	Pin Plug	6	
	SJJ-62	Pin Jack A, Input/Output	1	
	SJE-64	Pin Jack B, Speaker	1	
	SJE-66	Pin Jack C, Chassis	2	
	SBL-9024	Pivot	8	
	SUS-56	Stay Spring A, Right	2	
	SUS-58	Stay Spring B, Left	2	
	SUS-60	Stay Spring C, Bottom	3	
	SHG-318	Cushion Rubber (L), Amp. Box	2	
	SHG-320	Cushion Rubber (S), Amp. Box	2	
	SHG-314	Rubber Leg, Bottom Cover	4	
	SHR-208-1	PE Leg, Bottom Cover	2	
	XSN3+6R	Screw, Chassis M'tg	6	
	XSN3+10RS	Screw	3	
	XSN3+12	Screw, Rubber Leg	6	
	SQx-5362	Instruction Book	1	New
		APPEARANCE		
	SYK-702	Top Cover, Complete	1	New
	SHE-14	Screw, Top Cover	2	
	SYU-162	Bottom Cover Assembly	1	New
	SYK-704	Main Cabinet, Complete	1	New
	SYK-666	Side Panel, Complete (right)	1	
	SYK-668	Side Panel, Complete (left)	1	
	SYK-706	Speaker Cabinet, Complete without Speaker	1	New
	SGX-506	Trim A, Main Cabinet, Top	1	
	SGX-508	Trim B, Main Cabinet, Bottom	1	
	SGX-510	Trim A, Speaker System	4	
	SGX-512	Trim B, Speaker System, Right	4	
	SGX-514	Trim C, Speaker System, Left	4	
	SKD-2560	Dial Plate	1	New
	SBN-298	Knob, Tuning	1	
	SBN-300	Knob, Band Selector	1	

REPLACEMENT PARTS LIST (Cont'd)

REF. NO.	PART NO.	DESCRIPTION	PER SET (pcs.)	REMARKS
	SBN-302	Knob, Volume & Tone Control	4	
	SBN-342	Knob, Power Switch	1	
	SGW-2046	Escutcheon Assembly	1	
	SKF-1400	Bottom Cover	1	
	SGK-312	Panel Assembly	1	New

REF. NO.	PART NO.	DESCRIPTION	
		CABINET	
1	SKM-2360	Top Cover, Amp. Box	Top Cover, Complete (Amp. Box) (SYK-702)
2	SGS-196	Dirt Protector Sheet	
3	SGK-258	Jack Indicator Label	
4	* SHE-14	Screw, Top Cover	Bottom Cover, Complete (Amp. Box) (SYU-152)
5	SKF-1200	Bottom Cover, Amp. Box	
6	SUW-400	Holder (Back), Top Cover	
7	SUW-402	Holder (Side), Top Cover	
8	* SHG-318	Rubber A (L), Cushion	
9	* SHG-320	Rubber B (S), Cushion	
10	SKM-2380	Main Cabinet	Main Cabinet, Complete (SYK-704)
11	SGK-312	Panel Assembly	
12	* SGX-506	Trim A, Top	
13	* SGX-508	Trim B, Bottom	
14	RGB-2	N Badge	
15	SGW-2046	Escutcheon Assembly	
16	SYK-666	Side Panel, Complete (Right)	
17	SYK-668	Side Panel, Complete (Left)	
18	SYK-706	Speaker Cabinet, Complete without Speaker & Speaker Cord	
19	SYK-1400	Bottom Cover	

Note: Replacement parts without "*" mark are to be ordered in the form of assembly.